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ABSTRACT

The document contains papers of seven research studies conducted by graduate students at the Speech and Hearing Center of the Department of Communication Arts and Sciences at Queens College of the City University of New York. Papers have the following titles and authors: "Assessing Pragmatic Functioning in Language Disordered Children" (K. Majlinger, et al.); "The Roles of Comprehension and the Semantics of Verbs in Training an Adult to Produce a Grammatical Morpheme" (A. Ollendorf, S. Longtin); "Early Emergence of a Verbal Inflection--Semantic and Pragmatic Considerations" (G. Rand, et al.); "The Effect of Age on the Prediction of Hearing Levels from Acoustic Reflex Thresholds in Persons with High-Frequency Hearing Losses" (T. Feder, et al.); "A Case Study of a Down's Syndrome Child's Discourse Abilities" (S. Faine, S. Longtin); "Focusing on Mother-Child Interaction in Therapy with a Language Impaired Child" (E. Kriehn, E. Geller); and "A Pragmatic Touch to Teaching an Emotionally Disturbed Child Prosody" (C. Siomkos, S. Wollner). (DB)

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WORKING PAPERS IN EXPERIMENTAL SPEECH-LANGUAGE PATHOLOGY AND AUDIOLOGY

Speech and Hearing Center
Department of Communication Arts and Sciences
Queens College of the City University of New York

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August 1981

We are extremely pleased to produce this tenth volume of the Working Papers. A decade ago, we felt that bringing experimental rigor to the clinical process was a high priority for training programs. Our goal continues to be realized.

This current volume reflects contempory clinical concerns. The studies were done by graduate students supervised by our staff. Some need more refinement and replication. However, they present insights and strategies for dealing with a few of the vexing questions with which clinicians are concerned.

During the past ten years, we have published more than sixty experimental papers in these volumes. Many have been cited in prestigious journals and books. We are proud of this endeavor and continue to hope that it will serve as a model for other training programs.

Robert Rosenbaum
Joel Stark

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Assessing Pragmatic Functioning in Language Disordered Children

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Sima Gerber Wollner*
Susan Longtin*

Abstract

The purposes of this study were 1) to develop a means of assessing pragmatic functioning in language disordered children based on the communicative behaviors exhibited by a group of normal children and 2) to evaluate the pragmatic abilities of language disordered children at different linguistic levels. Specific contexts were designed to elicit communicative functions, or speech acts, and were presented to normal children at different stages of linguistic development. Results indicated that a large percentage of the contexts were successful in eliciting the expected communicative functions. These contexts were then presented to language disordered children who were matched to the normal subjects on the basis of mean length of utterance. Comparisons were made between the language disordered and normal subjects' use of language to express communicative intentions. Differences were observed in the type and frequency of speech acts elicited. In addition to pragmatic behaviors, play behaviors were examined in order to explore the relationship between representational abilities in language and in play.

Studies of normal child language, when viewed historically, demonstrate a progression from examining the structure of linguistic forms towards a focus on the context in which communication occurs. It has been suggested that analysis of phonological, syntactic and semantic aspects of language does not provide us with information concerning a child's intention in using an utterance. Bates (1976) defines pragmatics as "rules governing the use of language in context" (p. 420) and postulates that all language acts are pragmatic in their origin and further, that the acquisition of language has as its roots the development of pragmatic functioning prior to speech itself.

Bruner (1975a; 1975b) has interpreted certain prelinguistic behaviors of infants in interactions with their mothers as providing the framework of conceptual development which leads the child into language. He concluded from his observations that "joint activity" and "joint attention" which take place in mother-infant play routines provide the context and serve as precursors for linguistic reference, topic-comment organization, communicative intentions and explicit predication. Bruner referred to paralinguistic behaviors, phonological and intonational, as possible early signalling devices in the child's communication. He emphasized the importance of taking into account the use of speech acts to understand the transition from prelinguistic to linguistic communication and traced the child's progress from demand to request to exchange to reciprocal (developed in joint attention) modes of interaction. He concludes that these primative communicative acts represent

*Faculty Supervisors

the beginnings of speech act development.

Halliday (1975) has described the child's development of the adult language system in terms of three phases. Phase 1 represents an idiosyncratic means for expressing six communicative functions (instrumental, regulatory, interactive, personal, heuristic and imaginative). These functions are expressed through phonological and intonational patterns which develop into recognizable lexical units. In Phase 11, the emergence of grammatical structure and the beginnings of conversational interchanges enable the child to perform more complex communicative acts and are prerequisites to the development of the adult system. Phase 111, which denotes the beginnings of adult communication, is characterized by three basic functions which allow the speaker to use language in infinite and multifarious ways.

Dore (1975) presented a speech act analysis of children's one word utterances and proposed a theory of language acquisition which suggests that the "child's pragmatic intentions gradually become grammaticalized as semantic and syntactic structures" (p. 21). He proposed that the "rudimentary referring expression", the word itself, and the "predicating expression", utterances beyond one word, develop as a subcomponent of the speech act. His model accounts for the child's ability to communicate the "primitive force" or intention of his utterances through different prosodic patterns and accompanying gestures. Dore suggested that contextual features are also clues to the child's intentions. Among the primitive speech acts which Dore has identified are labelling, answering, requesting, calling, greeting and protesting.

In an examination of children's pragmatic abilities beyond the one-word stage, Dore (1976) applied a speech act framework to the utterances of preschool children. He concluded that a higher level of linguistic competence allows a child to express more sophisticated illocutionary acts which require utterances of certain grammatical forms and the operativity of social constructs such as rights, obligations, institutionalized roles and procedures. He identified 32 types of illocutionary acts which he categorized into six main types: Requests, Descriptions, Statements, Conversational Devices and Performatives.

In addition to the application of speech act analyses to child language, recent interest in pragmatics has led to investigations of the child's conversational skills. Garvey (1977; 1979) has pointed out that very young children are both responsive and relevant in their conversations with peers and adults. In a study which involved nursery-school subjects, Garvey (1977) found that preschool children demonstrated complex conversational skills. Garvey analyzed spontaneous speech samples of same-age dyads which showed that young children both used and responded to "contingent queries". She observed that these requests for clarification were used "in cases of failure of comprehension to adjust the information required by the speaker in order to respond appropriately" (p. 87). Garvey's data shows that unlike older dyads (42 to 52 months; 55-67 months), the youngest aged dyads (34 to 39 months) were relatively inattentive to their listener's needs, in that fewer responses to queries were observed.

Research in the area of pragmatics and normal language development has

led to an interest in applying these theories to studies with language disordered children. Prior to the publications of Dore (1975) and Halliday (1975), classification systems for categorizing communicative intentions did not exist. However, as early as 1968, Cunningham observed that children labelled psychotic were using language forms and communicating differently from children labelled mentally retarded. The psychotic group demonstrated more frequent use of noncommunicative speech and a greater number of demands and requests than the mentally retarded group.

The first major attempt to compare language disordered and normal children with regard to pragmatic development was done by Snyder (1975). In her study with children at the one word stage of development, she compared the performances of 15 language disordered and 15 normal children on specific measures of pragmatic abilities including the use of declarative-performatives and imperative-performatives. The two groups were matched on mean length of utterance. In order to analyze these behaviors, Snyder set up contexts designed to elicit early performatives and evaluated the child's response on a five point scale ranging from non-verbal to verbal. The declarative-performative was defined by Snyder as the use of gesture and/or vocal communication to attract the adult's attention. The use of a request-command to obtain an object from an adult was considered an example of the imperative performative. Snyder's results supported her hypothesis that language disordered children were deficient in their pragmatic abilities when compared to normal children at the same stage of linguistic development. In general, the language disordered children performed more poorly than normal subjects on both performative measures in that they generated more non-responses to tasks, more sensori-motor imperatives and fewer verbal performatives.

Schecterman, Wollner and Geller (1978) and Baldo, Wollner and Geller (1978) also observed pragmatic deficits in language impaired children. Schecterman et.al. found that the emotionally disturbed child in their study expressed significantly fewer Descriptions than a normal child matched on M.L.U. and used Requests as a primary mode of interaction. Baldo et.al. observed that the autistic-like child in their training study learned to use utterances trained in the Request function but did not express the same content/form interactions to express Comments.

In a study by Curtiss, Prutting and Lowell (1979), spontaneous language samples were collected from 12 hearing impaired children within four different settings and analyzed in terms of semantic and pragmatic categories. The major findings of this study indicated that a wide range of pragmatic intentions developed prior to and more fully than linguistic ability. The children studied were able to express the same range of pragmatic intentions through verbal and non-verbal means as normal children of the same age, whereas comparisons in semantic development revealed several differences between their subjects and normals.

Further evidence for differences between structural and communicative aspects of language development was presented in a case study by Blank, et.al., (1979). The child in this study demonstrated normal functioning in expressive syntactic-semantic skills, however, he displayed ineffective functioning in interpersonal communication skills.

In the last two studies mentioned, data was obtained from spontaneous language samples. This type of methodology implies that the use of specific speech acts was not obligatory. The present study provided systematic manipulation of the nonlinguistic and linguistic context to optimize the possibility that certain communicative intentions would be used. These contexts were presented first to normal children in order to determine the validity of their design for eliciting the desired speech acts. Furthermore, a variety of contexts were constructed for each communicative function allowing for individual variation in the subjects' interests and experiences. The experimental contexts used in this study were naturalistic and could be described as low structured observational settings.

In addition to examining the pragmatic abilities of language disordered children, the present study also explored the relationship between cognitive development and the development of language. Identifying the nature of the deficit underlying childhood language disorders is a primary concern in the study of such disorders. Parallels between cognitive and language development have been discussed by many investigators and different models have been postulated to account for the interaction between cognitive and linguistic systems. In general, the theoretical framework for these comparisons is based on the Piagetian notion of the development of representational abilities underlying the behaviors of deferred imitation, symbolic play, drawing, dreaming, mental imagery and language. According to Piaget (1951) two levels of play, practice play and symbolic play characterize the earliest periods of development.

In terms of the relationship between pragmatic and cognitive abilities, Bates, Camaioni and Volterra (1975) found that the development of prelinguistic communicative intentions paralleled the development of certain cognitive skills; specifically means-end relations. The emergence of linguistic performatives, in other words, the use of words in an act of reference, corresponded to cognitive symbolic functioning as evidenced in the beginnings of symbolic play.

Evidence supporting the notion of a general representational deficit underlying language disorders has been presented by various investigators based on the symbolic play abilities of language disordered children. Morehead (1972) collected data for five linguistically deviant subjects in order to test the hypothesis that "language development and symbolic play would be more closely correlated than linguistic and general intellectual development" (p.5). Play behaviors were observed in three contexts designed to determine the level of play the child was capable of. The data collected revealed that linguistic level and symbolic play were more closely correlated than linguistic and general (non-verbal) intellectual development. Morehead suggested that these findings were indicative of a general representational deficit in linguistically deviant children.

Brown, Redmond, Bass, Liebergott and Swope (1975) analyzed symbolic play behaviors in normal and language disordered subjects based on a scale developed by Lunzer (1959). The authors found that the symbolic play of the language impaired children was less complex than the play of normal children in the same age groups.

Somewhat contradictory findings were reported by Folger and Leonard (1978)

in a study which examined the performance of normal and language disordered children matched on M.L.U. on selected portions of the Uzgiris-Hunt scales. These sections were designed to elicit stage 5 and stage 6 abilities in means-end relations and schemes for relating to objects. The authors found that both normal and language disordered subjects at the two-word stage of development performed better on the cognitive scales than subjects using single-word utterances. However, when age was controlled, no clear relationship between utterance length and sensori-motor behaviors could be determined. Folger and Leonard concluded that only a very general relationship exists between early cognitive and linguistic achievements.

Snyder (1975) presents data which she interprets as supporting a "specific representational deficit in the language disordered child which affects the dynamic aspects of symbolization" (p. 167). The Ordinal Scales of Psychological Development (Uzgiris-Hunt 1975) were administered to determine which areas of sensori-motor functioning best predicted pragmatic performances. Of the six scales given, Snyder found that stage 6 means-end relationships was the only cognitive ability that significantly predicted children's performance on pragmatic tasks. Language disordered subjects displayed deficits in the dynamic aspects of representation in both cognitive (means-end) and linguistical (pragmatic) areas of symbolic functioning.

Symbolic play has been explored in studies with language disordered and normal children in two ways: Through naturalistic observation and in elicited contexts. Experiments which have evaluated cognitive functioning in language disordered subjects can be criticized for matching subjects on the basis of chronological age and for using elicited rather than naturalistic contexts. Few studies, with the exception of Snyder (1975) and Folger and Leonard (1978) have attempted to observe cognitive abilities by matching normal and language disordered populations on the basis of M.L.U.

The present study examined the relationship between cognitive and linguistic abilities in normal and language disordered subjects who were matched on linguistic level through the observation of symbolic play behaviors in naturalistic contexts. Furthermore, the notion of a specific representational deficit underlying language disorders (Snyder, 1975) was examined by relating pragmatic abilities to cognitive abilities, specifically symbolic play.

The purposes of this study included:

(1) To develop a battery of contexts based on normal children's performance to elicit a broad range of communicative functions.

(2) To determine whether language disordered children present specific deficits in pragmatic aspects of language development.

(3) To explore the notion of a specific relationship between pragmatic abilities and symbolic play.

Method

Subjects:

The subjects in this study were eight children ranging in age from 2 years; 1 month to 7 years; 4 months. They were divided into four groups; two groups of normal and two groups of language disordered children. The normal children were assigned to groups on the basis of their mean length of utterance (M.L.U.). The language disordered children were matched to the normals according to M.L.U. Group 1 (normal children) and Group 3 (language impaired children) had M.L.U.'s ranging from 1.0 to 2.0. Group 2 (normal children) and Group 4 (language impaired children) had M.L.U's ranging from 2.5-3.5. Spontaneous language samples were obtained from all subjects for the purpose of determining M.L.U. These samples were analyzed according to procedures outlined by Bloom and Lahey (1978), prior to the initiation of the investigation. Table 1 presents a composite of all subjects and identifying data.

The normal children had reportedly attained developmental milestones within normal limits and were evaluated by a speech-language pathologist as being free of any communication disorder. The language disordered subjects were enrolled in language intervention programs at the Queens College Speech and Hearing Center.

Table 1. Description of Subjects

	Subject #	C.A.	M.L.U.
Group 1	1 (A.N.)	2.1	1.4
	2 (C.S.	1.6	1.9
Group 2	3 (G.C.)	2.11	2.7
	4 (J.R.)	2.7	3.4
Group 3*	5 (S.C.)	4.11	1.5
	6 (B.G.)	7.4	2.0
Group 4*	7 (H.S.)	4.7	2.5
	8 (D.B.)	7.2	2.9

*Language Disordered Children

Subject 5, (S.C.)., a 4.11 year old language disordered male, reportedly achieved developmental milestones within normal limits with the exception of speech and language. The initial speech and language evaluation revealed significant delay in expressive and receptive abilities. The child exhibited appropriate social-interaction patterns. S.C. had been diagnosed by a

neuropsychologist as exhibiting delayed "overall functioning 2 years below age level". S.C. had been enrolled in speech and language therapy for about 2 years prior to the study. Language intervention focused on increasing vocabulary, developing semantic-syntactic relations, and increasing expression of functions of speech.

Subject 6, (B.G.), a 7.4 year old language disordered male was reportedly delayed in all spheres of development including motor, social and speech and language areas. The initial speech and language evaluation revealed deficits in receptive and expressive language as well as social-interaction skills. B.G. has been diagnosed by various professionals as exhibiting "deficits in communication", "poor social skills" and "cognitive impairment". Further, he had been variously labelled by neurologists and psychologists as "autistic", "emotionally handicapped" and "developmentally delayed". Subject 6 had been enrolled in speech and language therapy for a period of 4 years prior to the study. Therapy goals included expanding the child's ability to use linguistic forms to encode early occurring content categories within a range of communicative functions, increasing reciprocal interaction with peers and adults, and developing appropriate play behaviors.

Subject 7, (H.S.), a 4.7 year old language disordered male, reportedly exhibited normal development up until the age of 18 months when speech and language maturation decelerated. The initial speech and language evaluation revealed a delay in expressive and receptive language abilities. Social and interactional skills were judged as being age appropriate. H.S. had been evaluated by a neuropsychologist as presenting "normal intellectual ability with evidence for a neurologically based severe speech and language disorder". Subject 7 had been enrolled in speech and language therapy for a period of 9 months prior to the initiation of the investigation. Therapy goals focused on increasing the variety of forms and range of semantic-syntactic relations used within various functions of language.

Subject 8, (D.B.), a 7.2 year old language disordered male, reportedly achieved developmental milestones within normal limits, with the exception of speech and language. D.B.'s initial speech and language evaluation revealed severe deficits in the comprehension and production of language. He further exhibited inappropriate social interactions and communication behaviors. Subject 8 had been differentially diagnosed by medical professionals as "congentially dysphasic", "mentally retarded", "distractible" and "hyperactive"; and as exhibiting "deficitis in neurologic functioning and behavioral patterns". Subject 8 had been enrolled in speech and language therapy for a period of about 4 years prior to the study. Therapy goals included the development of appropriate play and social interaction behaviors. Speech and language intervention focused on expanding D.B.'s ability to express early occurring semantic-syntactic relations within various communicative functions.

Apparatus:

Experimental sessions were conducted in a 12' x 15' therapy room located at the Queens College Speech and Hearing Center. The area was cleared except for those stimuli necessary to create the contexts. One experimenter interacted with each subject for the duration of one complete experimental session. The other experimenter and a Faculty Supervisor, familiar with the analysis for

the investigation, were present during all experimental sessions to record both verbal and non-verbal behaviors as well as ongoing play activity. The time duration for each context presentation was recorded. All experimental sessions were audio and videotaped, using a SONY 3400 deck. Videotapes were transcribed at a later date by two of the experimenters. Stimulus materials utilized during the various experimental contexts are presented in Appendix A.

Procedures

For purposes of data analysis, the following definitions were used. A Communicative Intention was defined as a verbal and/or non-verbal act with a specific communicative function. A Verbal Act was defined as any occasion where the child used a linguistic utterance to communicate intentions. These may or may not have been paired with non-verbal behaviors. (Definitions of Communicative Intentions can be found in Appendix B). A Non-Verbal Act was defined as any occasion where the child used a recognizable gesture and/or vocalization to communicate intentions. (e.g., the child signals a Protest by holding up hand in a "stop" configuration as he turns away from examiner. The child signals a Description by using an iconic gesture to indicate a particular action or by using a vocalization or noise associated with action). Immediate Repetition was defined as an utterance which represented the exact lexical and semantic-syntactic form of the prior utterance and which served the same communicative intention as the prior utterance. Unintelligible was defined as an utterance which was inaudible or incomrehensible. Uninterpretable was defined as an act which could not be assigned a particular communicative function.

Initially, 25 experimental contexts were designed for the purpose of eliciting the specific communicative functions described in Appendix B. These contexts were presented to two of the normal children, one from each M.L.U. group. The purpose of these initial sessions was primarily to determine the validity of the proposed contexts. Those contexts which met the objects of their design, in other words which elicited the expected Communicative Intentions, were presented to the remaining 2 normal and 4 language disordered subjects. Thus, a battery of 18 contexts developed from the preliminary analysis were presented to all 8 subjects. A description of these contexts, materials and the expected communicative intentions can be found in Appendix A.

It should be noted that a variety of contexts were devised for evaluating each communicative function and that several contexts examined more than one function. Although there was a variable number of contexts used for each function, each child was exposed to the same 18 contexts. Due to individual differences among the children, one context per function was eliminated for each child. In this way, the children were not penalized for rejecting a context which was not of interest to them. At times, contexts were excluded because the child had not received the specified number of trials.

In order to elicit the Communicative Intentions, the examiner interacted with the child and presented experimental trials. Trials were defined differently according to the nature of the communicative function elicited. In terms

of self-initiated acts, trials were defined as any occasion where the experimenter used non-verbal means to solicit and direct the child's attention towards a specific object or action. Gestures (e.g. indicating or performing an action, pointing to or offering an object) and/or social fillers (e.g. "ooh", "wow") were employed. In eliciting the function Request Answer (WH), the examiner occasionally used the utterance "No" if a child incorrectly labelled an item.

For conversational devices, trials were defined as any occasion whereby the experimenter manipulated the situational context and/or used verbal means to elicit a conversational act. For Calls and Greetings this usually involved non-verbal means. For example, the examiner would leave the room during an interaction to elicit a Call. In some instances, verbal means were used if non-verbal methods proved ineffective. For example, to elicit a Greeting the examiner said "Time to go". Trials for Request for Clarification consisted of the examiner's use of a sophisticated lexical item or a partially inaudible or unintelligible utterance. For Responsive Acts, trials were defined as any occasion where the experimenter used verbal means to solicit a communicative response from the child. The total number of trials for each specific function is presented in Table 2 of the results section.

In order to establish inter-tester reliability, all tapes were transcribed independently by two experimenters. Once a context was completely transcribed by each experimenter, a reliability check was performed. When the same communicative function was assigned to an act by both experimenters, it was included in the analysis. When discrepancies occurred for the assignment of particular acts, the following steps were initiated:

(1) The tape was replayed and if subsequent independent analyses eliminated discrepancies, the act was included in the data.

(2) The verbal and non-verbal aspects of the specific act were discussed. If discussion yielded agreement, the act was included in the data.

(3) If agreement could not be achieved, the act was excluded.

In order to investigate symbolic play behaviors, two low-structured observational contexts were presented to all subjects. Prior to the initiation of these procedures, a 10 minute "warm-up" context allowed the child to become acclimated to the experimental environment. For the "warm-up" context the mother of each child was asked to interact with her child as if they were in a typical play situation in the home.

Within the contexts designed to observe symbolic play behaviors, each child was presented with specific toys and objects (See Appendix A). The child was allowed to play independently for a period of 10 minutes within each context. An experimenter was present and would, on occasion, participate in play if summoned by the child. No attempt was made by the examiner to initiate any activities related to the stimulus objects. Parameters used to evaluate instances of play behaviors were adapted from a Scale devised by Nicholich (1977). Transcriptions of each child's behaviors were independently recorded and subsequently analyzed by two experimenters. Levels

were then assigned for each child. The Scale used in evaluating Symbolic Play behaviors is illustrated in Appendix C.

Results

In the transcription of each child's data, every verbal and/or non-verbal Communicative Intention was recorded. These included responses to specific experimental trials as well as spontaneous communicative acts. For the purposes of the present analysis, those acts which were contingent upon presentation of trials were used to evaluate the performance of each subject. Reference to spontaneous communicative acts which occurred within contexts designed to elicit them, is made whenever discrepancies between elicited (within trials) and spontaneous acts were found.

The performances of Subjects 1 and 2 (normal children; M.L.U. 1.0 - 2.0) were analyzed and compared to Subjects 5 and 6 (language disordered children; M.L.U. 1.0-2.0). Similarly the performance of Subjects 3 and 4 (normal children; M.L.U. 2.5-3.5) were analyzed and compared to Subjects 7 and 8 (language disordered children; M.L.U. 2.5-3.5).

The total number of elicited verbal and non-verbal Communicative Intentions expressed by each subject is presented in Table 2. These figures reflect use of each function relative to the trials presented. The number of trials, i.e. the total occasions which provided opportunity to express these functions, is also given. The total number of trials per context varied according to Communicative Intention. This variability was a result of efforts to present naturalistic situations. In some cases, as with Greetings, Calls and Protests, it would have been artificial to elicit functions more than one or two times per context.

Criterion levels for productivity of each communicative function were based on the normal subject's performances. Thus, for each language disordered child, a function was considered to be productive if it was observed at least as often as the lowest number of occurrences for normal children within the same M.L.U. group. For example, in the lower M.L.U., subject 1 used 2 calls/attention getters and subject 2 used 5 calls/attention getters. Therefore, the criterion for productivity for this function was set at 2 occasions. Criterion of productivity differed across functions.

Group Performance

Self Initiated Acts, with regard to comments, both language disordered children in the lower M.L.U. group reached the criterion of productivity for labels and in fact, produced twice as many lables as the normal children. For descriptions, 1 language disordered child (S.C.) met the criterion level and the other child (B.G.) did not. It should be noted that data from spontaneous acts indicated that the child did express this intention. For the higher M.L.U. group, both language disordered subjects reached and exceeded the productivity level for labels. One language disordered child produced twice as many labels as the normal children. For descriptions, 1 language disordered child (H.S.) met the criterion level and 1 did not (D.B.). Spontaneous data for this child demonstrated use of the function.

In terms of Requests for Groups 3 and 4, criterion levels of productivity

were determined arbitrarily for request action/object. The decision to do this was based on the fact that there were many occurrences of request observed for all normal subjects in both M.L.U. groups. All language disordered subjects met and in fact, exceeded criterion levels for this intention. For protests, all language disordered children met the criterion level. One language disordered child (B.G.) in the lower M.L.U. group communicated all protests non-verbally while one language disordered child (D.B.) in the higher M.L.U. group communicated 50% of his protests non-verbally.

Performance of the normal children (Group 1) indicated that requests answer (WH) was not productive at the lower M.L.U. level. Out of a potential 12 trials, only 1 Request-Wh was observed. It should be noted that in Group 3, one language disordered child (B.G.) did communicate this function on 3 occasions. In Group 4, both language disordered subjects failed to meet the criterion level for request answer (wh). Both of the children did however, express the intention spontaneously. With regard to conversational devices, both language disordered subjects in the lower M.L.U. group met and exceeded the level of productivity for calls/attention getters and for greetings. It should be noted that for requests for clarification, the normal children in Group 1 did not demonstrate use of this communicative intention. One language disordered child (B.G.) did express this intention in 50% of the presented trials.

In the higher M.L.U. group, one language disordered child met criterion (D.B.) and one language disordered child (H.S.) did not meet criterion for use of calls/attention getters. Similarly for greetings, one language disordered child (H.S.) met the level of productivity and one did not (D.B.). Both language disordered children in this group failed to meet the productivity level for requests for clarification.

Responsives: Both language disordered children in Group 3 met levels of productivity for response WH questions (in this case, the productivity level was exceeded) and response to requests for clarification. The language disordered children in Group 4 also met the criterion level for response to Wh questions. For response to requests for clarification, in Group 4, one language disordered child (H.S.) met criterion and one did not (D.B.)

Individual Data:

Examining these findings by individual subjects rather than by groups revealed differences in the performances of language disordered children. Table 3 presents a profile for each language disordered subject which indicates those Communicative Intentions which were or were not productive.

Subject 5: S.C. demonstrated use of a wide range of Communicative Intentions. Indeed, this child reached the Criterion of Productivity for all functions examined within this study. It should be noted that many of S.C.'s communicative acts were conveyed by both verbal and non-verbal means. In terms of non-verbal behaviors, he displayed an elaborate gestural repetoire and behaviors which suggested that he was a very "communicative" child. These behaviors included a variety of intonational patterns and facial expressions,

appropriate eye-gaze, and the use of many verbal and non-verbal attention getters within intentions. In short, this child's interest in maintaining communicative interactions was the essence of his communicative style.

Subject 6: The results for B.G. suggested that he used most communicative functions. Only Descriptions failed to meet criterion. However, when non-verbal behaviors were considered, it was clear that this child exhibited an unusual communicative pattern. Gesture, facial expression and changes in intonation were rarely used in communicative acts. Inappropriate gaze behaviors were frequently noted. In one instance, within a Call trial, it was observed that this child directed his verbal behavior towards an inanimate object (a cabinet situated against a wall) rather than the adult he intended to call.

Subject 7: H.S. did not achieve Criterion of Productivity for 3 out of 10 of the Communicative Intentions investigated. It is interesting to note that these three Communicative Intentions, Request Answer (WH), Calls, and Request for clarification, represent functions which solicit a contingent response from the hearer. It is possible that this child's failure to communicate these functions as expected (i.e. on trial presentations) suggested a non-assertive style of communication.

Subject 8: Results for D.B. indicated that this child did not reach levels of productivity for 5 out of 10 of the Communicative Intentions examined. Based on Criterion of Productivity and his performance on trials, this child demonstrated deficits in pragmatic abilities. This seemed to be particularly true for functions which naturally occur within ongoing discourse. Deficiencies in the use of Request for Clarification, Response to Request for Clarification and Request Answer (WH), reflected an inability to keep the meaning flowing in conversational situations. Deficits in the use of Greetings further showed that this child was ineffective in dealing with interpersonal functions of language. Although results for Calls/Attention Getters indicated productivity, qualitive differences in his behaviors should be noted. On two occasions of the use of a Call, D.B. whispered the experimenter's name, even though this examiner was on the other side of the door. Other odd characteristics of this child's communicative style included the use of jargon. Further, infrequent use of gesture, facial expression and varied intonation patterns was observed.

Symbolic Play:

Results of the analysis of symbolic play behaviors for each subject are presented in Table 4. A level of play was assigned to each child according to observed behavior in two contexts. The assignment of levels was based on a single occurrence of a behavior. Therefore, the level indicates the kind of play the child was 'capable of', although this was not necessarily pervasive.

For the normal children, the results indicated that all four subjects achieved relatively high levels of play. No differences were observed when normal children were compared on the basis of M.L.U. That is, one child in the lower M.L.U. Group as well as one child in the higher M.L.U. Group exhibited behaviors which placed them at Level 5, (Multi-scheme combinations).

Table 4. Symbolic Play Results

Subjects *		Level
1 A.N.	(Normal)	6
2 C.S.		5
3 G.C.		6
4 J.R.		5
5 S.C.	(Disordered)	6
6 B.G.		1
7 H.S.		6
8 D.B.		4

* The MLU for subjects 1,2,5,6 is 1.0-2.0 and the MLU for subjects 3, 4,7,8 is 2.5-3.5

Similarly, one normal child in each M.L.U. Group exhibited Level 6 behaviors (Organized Symbolic Play Sequences).

Performance of the language disordered children in the lower M.L.U. group suggested that one subject (B.G.) demonstrated deficits in symbolic play behaviors. When compared to normal children at the same M.L.U., this child's play behaviors (which placed him within Level 1), was markedly different. Subject 5 (S.C.), exhibited Level 6 behaviors, (Organized Symbolic Play Sequences). This was the highest level analyzed within the scale.

Performance of the language disordered children in the higher M.L.U. Group suggested that one subject (D.B.) demonstrated deficits in symbolic play behaviors. This child's play behaviors placed him at Level 4 (simple play combinations) which indicated a lower level of play than two of the l.d. children and all of the normal children. Subject 7 (H.S.) exhibited Level 6 behaviors (Organized Symbolic Play Sequences).

Discussion

The results of the present investigation indicated that a specific battery of contexts could be designed for eliciting the use of a range of communicative intentions in normal children. Having developed a viable research tool based on normal children's behavior, we were able to address the question of how language impaired children function in certain areas of pragmatic abilities.

In terms of the performance of the normal children, our data supported the results from previous studies (Dore, 1975,1976) which had indicated that normal children, from the earliest stages of linguistic development, convey a variety of communicative intentions. Two interesting findings were related to specific speech acts and the performance of normal children in the lower M.L.U. group (1.0-2.0). It was found that these children did not use language to communicate Request Answer (WH), although they did use Request Affirmation-Negation. That is, these younger normal children used a specific intonation pattern (a rising terminal contour) to request information from the experimenters. This was similar to examples cited by Dore (1975) for the primitive speech acts he referred to as Requesting (answer). For example, the utterance "Flower" was used to request information regarding the identity of a flower which fell out of a tissue box during one of the contexts.

In addition, the normal children in the lower M.L.U. group did not use the communicative function Request for Clarification. These children did, however, respond to such requests.

The use of video recording in the present study enabled the experimenters to code non-verbal as well as verbal behaviors which represented specific communicative acts. This method contributed to the reliability of the analysis of Communicative Intentions for all subjects. In addition, it led to the observation of qualitive differences in language disordered children which would not have been identified if only verbal behavior had been analyzed.

The results of this study indicated that some language disordered children do present specific deficits in pragmatic aspects of language development. Individual differences were observed across the performances of the language disordered children with regard to those speech acts examined. However, the data clearly substantiate deficits in pragmatic abilities in two of four language disordered subjects. For at least one subject, pragmatic abilities were significantly different from normal children at the same linguistic level.

The results also indicated that specific aspects of communicative abilities may be deficient in language disordered children who exhibit behaviors associated with emotional impairment. The communicative style of one child (Subject 8) was reflective of previously noted impairments in social interaction skills. Deficiencies were observed in this child's ability to code specific communicative intentions, in particular those acts which are associated with conversational competency. Limitations in this subject's ability to initiate and regulate conversational interchanges were exemplified in his failure to convey communicative acts such as Greetings, Request Answer (WH), Request for Clarification and Responses to Clarification Requests. Furthermore, this child exhibited deficits in non-verbal aspects of communication.

Deficits in non-verbal areas of communicative competence were particularly evident in the other emotionally disturbed subject in the present study. It is interesting to note although this child Subject 6 (B.G.) did verbally express the majority of communicative intentions

evaluated, qualitative differences between his and normal children's communicative patterns were evident. Non-verbal behaviors were rarely used to convey communicative intent and inappropriate eye-gaze behaviors and body orientation were noted. It was apparent, then, that analysis of non-verbal behaviors in this child supported the impression of deficits in communication, where an analysis of the type and frequency of verbally expressed pragmatic intentions did not.

It should be recalled that non-verbal behaviors have been considered by several investigators in child language as an essential aspect of pragmatic abilities in early stages of development. If pragmatic abilities constitute the base structure of communicative behaviors (Bates 1976 and Brune 1975 a&b), then these non-verbal aspects must be considered within the framework for assessment as well as intervention with language disorders.

The results for the remaining two subjects in this study again supported individual differences in the communicative behaviors of language disordered children. The performances of Subject 7 (H.S.) suggested specific deficits in the ability to initiate communicative interactions which serve the function of soliciting attention, information or clarification from the listener. For Subject 5 (S.C.), a wide range of communicative functions was observed. In fact, all of the communicative intentions observed in the matched normal subjects were also productive for this child. In addition, this child's use of non-verbal means to convey pragmatic functions contributed to a very effective communicative style.

Despite differences observed among the language disordered subjects, certain similarities in the performances of these children were also supported by the data. Those communicative intentions which were productive for all the subjects included the use of Request Action/Object, Protests, Labels, and Response to WH. Our findings for the productivity of Request and Protests may be similar to Snyder's (1975) results with language impaired children which indicated better performance on imperative measures as compared to declaratives. This difference was attributed to the "inherent nature" of the task in that failure to effectively generate imperatives meant that a child would not obtain a desired stimulus object. A similar interpretation could account for the productivity of protests.

When language disordered children are studied experimentally, a question concerning the relationship between observed performances and skills trained in language intervention programs with these children naturally arises. With regard to Labels, the results of the present study indicated that language disordered subjects showed a higher frequency in the use of this function than normal subjects matched on the M.L.U. In a study which compared the use of semantic relations in language impaired and normal children at the same stage of linguistic development, Freedmen and Carpenter (1976) found significant differences for only one relation: Introducer+Entity. The authors' definition of this relation corresponds to our definition of the communicative intention, Label. In a study of clinician-child discourse, Prutting et.al. (1978) found that one of the most frequent patterns of interaction between clinicians and language disordered children consisted of a Request Information-Response sequence. The results of the present study,

in terms of the productivity of Labels and Responses to WH, once again raises the question of possible artifacts of language training.

In terms of the relationship between cognitive and linguistic abilities, Snyder (1975) hypothesis that language disordered children exhibit a specific deficit in dynamic aspects of symbolic functioning was further explored by evaluating symbolic play behaviors. The results of our analysis of symbolic play failed to support either a general representational deficit in symbolic behaviors (see Morehead 1972) or a specific relationship between pragmatic aspects of language and symbolic play. Rather, the data again revealed individual differences in the performances of language disordered children.

In conclusion, this study has shown that the evaluation of language disorders within a pragmatic framework allows us to identify both quantitive and qualitative differences between normal and disordered children at similar levels of linguistic development. In addition, as has been noted in normal children individual differences were observed in the communicative patterns of the language disordered subjects. Contexts which were naturalistic and recording procedures which provided for the analysis of both verbal and non-verbal behaviors contributed significantly to these observations.

Appendix A. Description of Experimental Contexts.

Context	Materials	Expected Communicative Intention
Warm-Up: Freeplay context involving mother and child.	Tiny Village with many pieces for building, cars, people, etc....	———
Symbolic Play I: Low-structured observational context: child plays independently.	Child-sized stove, sink, cabinets, utensils, pots and pans, dolls, baby-bottle, brush, bathtub, paper, towel, shoebox, soap, sponge, tea-set, play-doh.	Observation of Symbolic Play
Symbolic Play II: Low-structured observational context: child plays independently.	Trucks, cars, blocks of various sizes, McDonald's, gas station, dolls, pipe cleaners.	Observation of Symbolic Play
1. Grab-Bag: Ex. and ch. take various toys/objects out of a large pillow case; objects included familiar and unfamiliar items.	Toy animals, screwdriver, handcuffs, binoculars, toy car, boat, brush, toy hairdryer, ball, etc....	1. Labels 2. Request Answer (WH) 3. Response WH-Question 4. Response to Request for Clarification
2. Picture Book: Ex. and ch. look at book together.	Sesame Street pop-up book or Circus-scene pop-up book with colorful displays and depictions of a variety of actions and characters.	1. Descriptions 2. Labels 3. Request Answer (WH) 4. Response WH-Question 5. Response to Request for Clarification
3. Stack-Toy: Ex. and ch. alternately re-assemble toy; ex. holds back last piece from ch.	Mickey-Mouse Stack-toy with graduated pieces.	1. Request Action/Object
4. Dollhouse: Ex. and ch. play with dollhouse on floor; related piece presented in bag.	Related doll figures, miniature furniture, dollhouse.	1. Labels 2. Descriptions 3. Response WH-Question

continued.

5. Floor-Mat: Ex. and ch. remove shoes and play on large floor mat situated in the middle of the floor; ex. ceases activ. to elicit Requests; walks away to elicit Calls; at termination of context, ex. attempts to put child's shoe on his hand (to elicit Protest).	Large Floor Mat	1. Calls 2. Request Action 3. Protest
6. Cookies and Milk: Ex. presents ch. with plastic jar cookies which ch. can't open and closed container milk; ex. walks out to elicit Call.	Container of milk, clear plastic jar of cookies; plates, cups.	1. Calls 2. Request Action/Object
7. Wagon: Ex. presents wagon; awaits Request for ride; ex. gives a ride then ceases action	Wagon	1. Calls 2. Request Action
8. Toy Town: Ex. and ch. play with toy town in middle of floor.	Town with related buildings, stores, people, etc....	1. Labels 2. Descriptions 3. Request Answer (WH)
9. High-Interest Toy: Ex. presents ch. with unique toy.	"Caliope"[r]	1. Request Answer (WH) 2. Request Action/Object
10. Schoolhouse: Ex. and ch. play with schoolhouse and familiar, as well as unfamiliar objects.	Toy schoolhouse, related objects, little Sesame Street people.	1. Descriptions 2. Labels 3. Calls 4. Request Answer (WH)
11. Telephone Enactment: A real telephone rings; ch. is encouraged to answer it.	Real telephone.	1. Greetings

continued.

12. Pillowcase with Objects: Ex. presents ch. with pillowcase full of unfamiliar objects and those which have sophisticated labels; all of the objects are emptied out of the pillowcase and placed in a pile in front of the ch.; ex. and ch. alternately throw objects into bag in gamelike manner; ex. says "put the (sophisticated or unintelligible word) in bag".	Seashell ("conch"), cannon ("artillery"), etc....	1. Request for Clarification
13. Circle Game/Blanket: Ex. and ch. engage in various "physical" games (e.g. "ring around the rosy; "London bridges", etc) Ex. walks away to a corner in the room and faces away from ch. to elicit Call.	Thick blanket.	1. Call
14. Flower/Tissue Box: Ex. and ch. alternately pull tissues out of a tissue box for a number of trials; the last trial, a plastic flower pops out of the box.	Pop-out tissue box; plastic flower.	1. Label
15. Whispering: $Ex._1$ and $Ex._2$ and ch. sit in a circular position on the floor; Ex. engages in pretend game with ch. and says "give" $Ex._2$ a kiss"; "give _____ a hug"; "give _____ a pinch" etc.... All three take turns playing this game; once ch. appears genuinely involved in activ., $ex._1$ whispers inaudible or unintelligible message to ch.	No materials required.	1. Request for Clarification

continued.

16. Protests:	Apple, lemon, plastic knife.	1. Protest
a) Lemon: ex. and ch. eat apple; then cut-up lemon while ex. encourages ch. to eat it.		
b) Water Squirt: ex. presents plant and atomizer; waters plant; ex. squirts ch. w/water	Real plant, atomizer filled w/water.	
c) Jelly: ex. and ch. eat crackers and jelly; ex. spreads jelly on ch.	Crackers, jelly, plastic knife and spoon.	
d) Slime: ex. presents Slime toy and asks ch. to hold out hand; pours it on him.	Slimer	
17. Mother leaves room: ch.'s mother leaves room after interacting with ch. and ex.	No materials required.	1. Call
18. Natural Leaving: Mother and ch. prepare to exit therapy room after completion of total experimental session; Ex.'s do not say anything but look at ch. and wave.	No materials required.	1. Greetings

Appendix B

Definition of Communicative Intentions:

The pragmatic categories utilized in the present investigation were basically derived from taxonomies presented by Dore (1975;1976). These systems were modified for the purposes of this study.

1. Self-Initiated Acts: Those acts that were elicited by non-verbal methods, such as social fillers ("oooh!", "wow!") and situational context.

A. Comments:

1. Label: Identifications of objects or people; e.g. "a boat", "those are wheels", "Cookie Monster".

2. Descriptions: Represent observable or verifiable actions, locations, properties, events, possessions; convey attitudes, internal states; e.g. "boy dance" (action), "shoe on there" (location), "it heavy" (property), "done jelly" (events), "my baby" (possession), "me don't know" (internal state), "baby nice" (attitude).

B. Requests:

1. Request Action/Object: Solicit actions or objects; e.g. "put this on", "I wanna play with house", "out of wagon". Also includes Indirect Requests, e.g. "can't open it".

2. Protests: Express objection to other's actions or behaviors; e.g. "no", "don't do that", "not in my eyes".

3. Request Answer (WH): Solicits hearer to provide information, or affirmation/negation about identity, location, or property of an object, event or situation; e.g. "What's that?", "where Mommy?", Block up there?".

C. Conversational Devices: Those acts which regulate contact and communicative interaction. These acts were elicited either by verbal or non-verbal means.

1. Calls/Attention Getter: Solicit other's attention " e.g. "Mommy!", "Kathleen!", "Look!", "Hey!".

2. Greetings: Initiate or terminate contact with hearer through the use of conventional forms; e.g. "Hi", "Bye-Bye".

3. Request for Clarification: Seek clarification of hearer's prior utterance; e.g. "Give Mommy the syringe" ---Child's response" "This?".

11. Responsive Acts: Those acts which were elicited by the experimenter's prior utterance.

A. Response to WH-Question (Who or What): The child's response is contingent on a WH-Question provided by the experimenter: e.g. "Who's that?" -- Child's response: "Big Bird", "What's that?" -- Child's response: "A toilet".

B. Response to Request for Clarification: Provide solicited clarification of speaker's prior utterance; e.g. Child: "That's Grover"; Adult: "Huh?", Child: "Grover".

Appendix C Symbolic Play Scale*

Level		Definition	Examples
I	Pre-Symbolic	Appropriate play with objects. Child shows understanding of object use or meaning.	Child rolls truck. Child very briefly mixes in pot with spoon, walks away. Child picks up towel and wipes shoes, drops it.
II	Self-pretend	Child pretends on himself within a single symbolic scheme.	Child pretends to eat from an empty spoon. Makes eating noises Child pretends to wash face with cloth.
III	Pretend beyond self	Child pretends on another object or includes other person in a single symbolic scheme.	Child pretends to comb examiner's hair. Child makes two dolls "kiss". Child moves car back and forth making "car" noises.
IV	Simple play combinations	Child relates a single symbolic scheme to several objects or persons in succession.	Child puts pretend food to mouth, makes eating noises, then offers "food" to examiner to eat. Child combs own hair, then examiner's, then doll's.
V	Multi-scheme combinations	Child relates three schemes to one another in a sequence.	Child washes doll in bathtub, brushes doll's hair, puts doll to bed. Child stirs in pot, licks spoon, then pours "gravy" onto plates with ladle.

Appendix C Symbolic Play Scale *

Level	Definition	Examples
VI Organized Symbolic Play Sequences	Child relates more than three behaviors together in an organized sequence.	Child goes over to sink, turns on "water", rubs soap on sponge, washes dishes, puts dishes in cabinet. Child makes playdoh "french-fries", puts them in pot, puts pot in oven, turns oven on, checks to see if they are done, puts plates out, serves "french-fries" with a spatula

* Adapted from Nicholich (1977)

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The role of comprehension and the semantics of verbs in training an adult to produce a grammatical morpheme.

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Abstract

This study investigated the efficacy of using comprehension to train the production of the third-person singular allomorphs, / s / and / z /, to a language-impaired adult. The present research also explored whether training semantic verb categories (action or state) would facilitate the acquisition of the subject-verb agreement rule. Three production tasks were administered to assess the effect of training. Results revealed that although comprehension training did not result in statistically significant improvement, training did facilitate production of the morpheme. Moreover, the semantic verb category was not instrumental in facilitating acquisition of the morpheme. Theoretical issues and clinical implications are discussed.

Several researchers have investigated the acquisition of grammatical morphemes by normal and language disordered children. Berko (1958) and Cazden (1969) collected data demonstrating that normal children develop grammatical morphemes in a uniform systematic order. Brown (1973) also found the order of acquisition to be relatively constant among the three normal children he studied. deVilliers and de Villiers (1973) examined the spontaneous speech of twenty-one normal children and their findings were similar. The language impaired children Johnston and Schery (1976) studied learned the same forms in much the same order as did the normal children studied by Brown and deVilliers and deVilliers. The only difference between the acquisition of grammatical morphemes by normal and linguistically deviant children was the rate at which the morphemes were acquired. Their study illustrated that language deficient children's use of grammatical morphemes parallels that of younger normal children.

In comparing the acquisition of grammatical morphemes in mentally retarded and normal populations, several researchers have found that the morphemes are learned in the same sequence for both populations, but the performance on tasks involving nonsense words for the language impaired children is poorer than the normals who matched according to mental age (Lovell and Bradbury, 1967; Newfield and Schlanger, 1968; Dever and Gardner, 1970; Bradbury and Lunzer, 1972 and Dever, 1972). To account for these results, investigators have argued that mentally retarded children produce inflected words as individual lexical items rather than as instances of the application of morphological rules, so that learning the words "talk" and "talks", for example, involves the learning of words instead of a root word, "talk", to which the third-person singular morpheme / -s/ is added. This explanation has been offered to account for mentally retarded subjects generally lower performance with nonsense items.

Bloom, Lifter and Tanouye (1978) and Bloom, Lifter and Hafitz' (1980)

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findings also shed light on rule learning. They found that the majority of the children's verbs occurred with only one variant, for example, the children said "fit and fits" but not "fitting"; similarly they said both "play and playing" but not "plays". This finding may appear to support the contention that lexical or word-by-word learning may exist. However, a more in-depth analysis of their findings indicated that "learning rules for verb inflection appear to be facilitated by the semantics of the verb and the syntax of the sentences that the children were learning" (Bloom, Lifter & Hafitz, 1980, 31). Lexical and grammatical rule learning appears to be complementary rather than being mutually exclusive processes.

To facilitate the development of a linguistic structure, the procedure used to train that structure warrants serious consideration. Some have argued that training methodologies should parallel the normal language development process (Asher, 1972; Bloom and Lahey, 1978). The role of comprehension in the acquisition of language has been the focus of research and controversy for several years. The view that comprehension precedes production was supported by Ingram (1974) who proposed that it is a linguistic universal of acquisition. The classic study often cited as evidence of comprehension ahead of production is that of Fraser, Bellugi and Brown (1963). They interpreted their findings to mean that in the acquisition of language, imitation precedes comprehension and that comprehension exceeds production. The authors suggest "that children learn a lot about the referential patterning, the stimulus control of grammatical forms, before they produce these forms" (p. 134).

Lovell and Dixon (1967) replicated the Imitation-Comprehension-Production tasks with one-hundred normal children ranging in age from two through six, and eighty educationally subnormal children ages six and seven. The purpose of their study was to determine grammatical performance in imitation, comprehension and production. The data they collected indicated that imitation precedes comprehension and comprehension precedes production in the course of language development. Their study confirmed Fraser et al.'s (1963) contention that "the child learns much more about the rules that relate to referential patterning before he can produce the forms" (p. 38). Furthermore, their findings indicated that the overall performance of the six year old educationally subnormal children was almost the same as that of the normal three year olds, while the seven year old educationally subnormal children responded much the same as the normal four year olds. Nurss and Day (1971) conducted a study in which they gave the Imitation-Comprehension-Production test to one-hundred and forty-seven Southern urban high status Whites, low status Whites and four year old Black boys and girls. The results substantiated the findings of the previously mentioned research that comprehension precedes production.

Shipley, Smith and Gleitman (1969) conducted an experiment in which they presented children ranging in age from eighteen through thirty-three months a number of commands which varied systematically in syntax and content. They concluded that those children functioning at the single word or holophrastic stage (those children who did not yet combine words) in production consistently preferred to respond to commands at or just

above their own productive limit. However, the children operating at the telegraphic stage (e.g., beginning to produce word combinations) in production tended to respond significantly better to the adult commands than to the grammatically incomplete commands. The authors identified this finding as demonstrating that comprehension abilities were more advanced than production abilities. Petretic and Tweney (1977) conducted a study that substantiated the findings of Shipley et al.'s (1969) experiment. They assessed the comprehension ability of thirty-six nursery school children ages 1.9 through 3.6 who were operating at early and advanced stages of telegraphic speech and also concluded that comprehension skills are more advanced than production skills for both early and advanced telegraphic speakers. Duncan and Erickson (1976) investigated the effects of different semantic relations presented in various verbal contexts with twelve normal and twelve mentally retarded children. They found that their subjects responded accurately to the expanded utterances more often than they responded to the telegraphic and nonsense forms.

A strong claim regarding the relationship between comprehension and production is that all or much of comprehension of language may be complete before any production begins and that the converse situation is never found (Ingram, 1974). Evidence for this claim of the primacy of comprehension over production is the case study described by Lenneberg (1962) of an eight year old boy who demonstrated extensive comprehension of English yet could not produce any speech because he had anarthria. This child learned to understand language despite his inability to execute motor patterns. Mann and Baer's (1971) also found that comprehension training facilitated verbal production. However, in their study, production meant subsequent imitation rather than spontaneous verbal production. Ruder, Hermann and Schiefelbusch (1977) conducted a study with fifty-one normal children ages six through eight and their results concurred with Mann and Baer's (1971) findings. Comprehension training has a facilitating effect on subsequent imitation training of the same items. Keeney and Wolfe (1972) examined the relationship between spontaneous production, elicited imitation and comprehension of subject-verb agreement in forty six 3 - 4 year old children. They reported that the children appeared to have command over the syntactic rule of agreement in their spontaneous productions. Hoffmann and Wollner (1977) and Paluszek and Feintuch (1979) investigated the effects of training the plural and third-person singular morphemes through imitation and comprehension procedures. Results of the two studies indicated that imitation training had no effect on the comprehension or production of these inflections, while comprehension training led to improved performance in production of the morphemes.

The present research utilized Bloom, Lifter and Tanouye's (1978) and Bloom, Lifter and Hafitz' (1980) findings regarding the semantics of verbs in training the production of subject-verb agreement through the use of a comprehension training procedure. One purpose of the study was to determine whether a language disordered adult's acquisition of the third-person singular inflections, /-s/ and/ -z/, would be facilitated by specific verb categories, that is, action or state. The other purpose was to determine if a comprehension training procedure facilitated the use of a morphological rule, that is, subject-verb agreement, when measured by performance in

three production tasks: elicited production, a referential communication task and a spontaneous language sample.

Method

Subject

The subject, C., was a 45 year old female who had received therapy at the Queens College Speech and Hearing Center for three and one half years. At the initial interview in July 1974, C. was diagnosed as having multiple articulation errors and a 30 dB bilateral sensori-neural hearing loss of a relatively flat configuration. Medical, social and educational history was incomplete. C. reported that she began public school at the age of 10 where she received special services. She never completed high school.

At the time of this study, C. exhibited conceptual problems and appeared to be functioning within the mildly retarded range. Her expressive language was characterised by errors of form in the areas of phonology, syntax and morphology. Prior to the onset of the experimental procedure, plates from two formal measures, The Wug Test (Berko, 1958) and the Northwestern Syntax Screening Test (Lee, 1969) were administered to further assess C.s production of morphological inflections. The results, consistent with informal language sampling procedures revealed that C. inconsistently omitted the third-person singular, past tense, plural and possessive morphemes in obligatory contexts. The rule chosen to train in this study was third-person subject-verb agreement because when C. omitted the third-person singular allomorphs, the listener experienced difficulty in understanding her.

To further assess C.'s phonological errors, the Fisher-Logemann Test Of Articulation Competence and the Templin-Darley Test of Articulation were administered. The results indicated that C. substituted phonemes in all positions and omitted final consonants. The phonological processes that governed C.'s substitution errors were stopping, fronting, devoicing and cluster reduction. Other formal testing included portions of the short version of the Minnesota Test for the Differential Diagnosis of Aphasia which revealed mild dysarthric involvement of the oral musculature and a depressed auditory memory span.

In previous therapy, the language concepts and forms trained included plurality, present progressive, past tense, articles and pronouns. In addition, work on categorizing, vocabulary usage and spelling was done. The target phonemes, /s/ and/z/, selected for the experiment had been previously trained, but failed to generalize to spontaneous speech. C. was judged to be highly motivated.

Apparatus

Experimental sessions were conducted in a 9' x 12' room at the Queens College Speech and Hearing Center. The subject and the examiner were seated opposite each other at a desk while the latter presented the stimulus materials. Data was collected by a second examiner. To establish reliability, an observer also recorded the data. The pre-and post-training baseline

language samples were transcribed and analyzed by the two examiners.

Twenty-four 3½" by 4½" black and white photographs were used in training. Half of the photographs depicted state verbs, while the other half depicted action verbs. Half of the state verb photographs depicted singular subjects, while the other half depicted plural subjects. Similarly, half of the action verb photographs depicted singular subjects, while the other half depicted plural subjects. Half of the singular-subject state verb photographs contained the / s / allomorph, while the other half contained the / z / allomorph. Similarly, half of the singular-subject action verb photographs contained the / s / allomorph, while the other half contained the / z / allomorph. Thus, the training materials were balanced with respect to semantic category of the verbs (action or state), allomorph (/ s / or / z /) and subject number (singular or plural). The sentences which described the photographs were balanced according to the mean number of morphemes and words.

Two 5" by 8" pictures which served as cue cards were also used during training. The singular cue card pictured a single person and had the number "1" written at the top of it, while the plural cue card pictured three people and had the words "more than 1" written at the top of it.

A 1' by 2' wooden barrier was used during the pre-and post-training referential communication tasks. This barrier was positioned between the examiner and the subject in order to prevent them from seeing each other's displayed photographs.

Procedure

This experimental study consisted of three training phases. For each phase, training was continued until the criterion of 92% correct response was achieved for three consecutive trials. However, if the subject did not reach the criterion within twelve trials in any given phase of the experiment, training was terminated.

During the first phase of comprehension training, the singular and the plural cue cards were placed on the table in front of the subject. The subject was shown one of the training photographs and the examiner produced an utterance that described the photograph (e.g., "The boy always builds a house" or "The boys always build a house"). The subject was required to match the training photograph to the appropriate cue card by placing the stimulus photograph under the appropriate cue card. Feedback about the correctness of the response was provided on every trial throughout the entire training procedure. In addition, the subject-verb agreement rule was stated through application to context four times in twelve trials during this first phase of training, approximately after every third presentation (e.g., "That's right. I said 'builds' so the sentence is about one person" or, "That's right. I said 'build' so the sentence is about more than one person"). There were twelve singular subject-verb agreement trials followed by twelve plural subject-verb agreement trials. Next, twenty-four randomized singular and plural subject-verb agreement trials were presented. Training was continued with the randomized singular and plural subject-verb

agreement presentations until the criterion of 92% correct response was achieved for three consecutive trials. The cue cards placed in front of the client were randomly alternated from right to left. The semantics of verbs, action and state, and the third person singular allomorphs, /s/ and /z/, were balanced throughout all experimental trials. Stimuli are shown in the Appendix.

During the second phase of the comprehension training, the subject was shown two contrasting photographs simultaneously. The subject was required to point to the picture which matched the utterance produced by the examiner (e.g., "Show me, The girl likes the cat" or "Show me, The girls like the cat"). There were twenty-four randomized presentations. The subject-verb agreement rule was stated eight times in the twenty-four trials, approximately after every third presentation.

During the third phase of comprehension training, the subject was shown two contrasting photographs simultaneously. She was required to point to the picture which matched the utterance produced by the examiner. The subject was deleted from these utterances (e.g., "Show me, Look mad" or "Show me, Looks mad"). There were twenty-four randomized presentations. The subject-verb agreement rule was stated eight times in the twenty-four trials, approximately after every third presentation.

Pre and Post Training Production Tasks. The subject's ability to use the target utterance when presented with sixteen of the original twenty-four stimuli (eight sets of matched singular and plural subject-verb agreement photographs) was assessed in an elicitation task. The examiner elicited the target utterance for habitual action in the following manner similar to the one which Berko (1958) used. For example, "This is a boy who knows how to ride. He is riding. He does it everyday. Everyday the boy _____" or "These are boys who know how to ride. They are riding. They do it everyday. Everyday the boys _____." The examiner elicited the target utterance for state verbs in the following manner. For example, "This is a boy who doesn't want to wear the old shoes. The boy _____" or "These are boys who don't want to wear the old shoes. The boys _____." The elicitation procedure was repeated once if the client failed to produce the target utterance. In addition, the written form of elicitation, with the target verb underlined, was presented if the subject failed to produce the target utterance after the second presentation.

The subject's ability to use the target utterance while participating in a referential communication task was assessed. The subject and the examiner were each given sixteen photographs (two groups of four sets of matched singular and plural subject-verb agreement photographs) which were separated by a barrier. The subject was instructed to describe each photograph so the listener can find the "right one". In this situation, the subject was directed to use a sentence containing the target structure to communicate her message. This procedure was repeated for the other four sets of matched singular and plural subject-verb agreement photographs until all sixteen photographs were presented. During this procedure, the examiner consistently picked up the target photograph regardless of whether the subject's sentence was correct or incorrect.

A spontaneous language sample was obtained and recorded. A topic of conversation was established by the examiner and the subject engaged in this conversation. The language sample was analyzed to determine the presence or absence of the third person singular allomorphs, /s/ and /z/, in obligatory contexts. The presence or absence of the allomorphs was analyzed with respect to the semantics of verbs, i.e., action or state.

Results

The criterion of 92% correct response over three consecutive trials was achieved for Phases 1 and 2 of the comprehension training. However, the criterion was not achieved for Phase 3. The subject reached criterion in three trials during Phase 1 and in ten trials during Phase 2. Training was terminated after the twelfth trial in Phase 3.

The percentages of correct use of the third-person singular morpheme for pre-training in the Elicited Production Task were as follows: overall-75%, action verbs-100%, state verbs-50%, /-s/ allomorph-75% and the /-z/ allomorph-75%. The percentages of correct use of the third-person singular morpheme for post-training in the Elicited Production Task were as follows: overall-88%, action verbs-100%, state verbs-75%, /-s/ allomorph-75% and the /-z/ allomorph-100%. To determine if the differences between the pre- and post-training baselines were significant, The Test for Comparing Two Observed Proportions (Natrella, 1963) was performed. The results of the one-tailed test indicated that the differences were not significant. To determine if the difference in inflection use between the action and state verbs during both the pre- and post-training baselines was significant, the two-tailed test was done. The differences were not significant. Similarly, to determine if the difference between production of the / -s/ and / -z/ allomorphs during both the pre- and post-training baselines was significant, the two-tailed test was performed. The differences were not significant.

Pre-training baselines for the Referential Communication Task were as follows: overall-0%, action verbs-0%, state verbs-0%, / -s/ allomorph-0% and / -z/ allomorph-0%. Post-training baselines for the Referential Communication Task were as follows: overall-25%, action verbs-0%, state verbs-50%, / -s/ allomorph-25% and / -z / allomorph-25%. To determine if the differences between the pre- and post-training baselines were significant, the same test (Natrella, 1963) was applied to the data. The results of the one-tailed test indicated that the differences were not significant. To determine if the difference in inflection use between the action and state verbs was significant, the two-tailed test was performed. The differences were not significant. Similarly to determine if the difference between the production of the allomorphs / -s / and / -z / was significant, the two-tailed test was performed. The differences were not significant.

The percentages of correct use of the third-person singular morpheme during the pre-training Language Sample were as follows: overall-37%, action verbs-43%, state verbs-29%, /-s/ allomorph-27% and / -z / allomorph-42%. The percentages of correct use of the third-person singular morpheme during the post-training Language Sample were: overall-40%, action verbs-50%, state verbs-33%, / -s / allomorph-33% and / -z / allomorph-44%. To determine if the

differences between the pre- and post-training baselines were significant, the previously mentioned analysis (Natrella, 1963) was applied to the data. The results indicated that the differences were not significant. The test was also performed to determine if the difference between the action and state verbs, and the /-s/ and /-z/ allomorphs was significant. The differences were not significant.

During the pre-training Elicited Production Task, the examiner prompted the subject by repeating the sentence and presenting the written form for the state verbs, "feels" and "looks", in order to elicit use of these target structures. However, the method of prompting was not successful. Rather, C. used the copula structure "is awake" rather than "feels very tired", and "is sad" rather than "looks very mad". Similarly, during the pre-training Referential Communication Task, C. failed to use the target verbs with the exception of "ride" and "look". The verbs C. used were inflected with the present progressive form with and without the auxiliary. Thus, in both of these production tasks, the subject's pre-training performance with certain verbs reflected the non-use rather than the incorrect use of the target structure. During the post-training Elicited Production Task, C. used the third-person singular form. However, the 88% correct use reflects the fact that she omitted the form in only one instance. During the post-training Referential Communication Task, C. consistently used the present progressive form with the exception of the verbs, "needs" and "looks".

Discussion

The results of the present investigation revealed that comprehension training alone did not facilitate significant use of the third-person singular morpheme. However, the training led to improved performance in production indicating that the comprehension procedure may have moved C. along in the process of learning the form. According to Brown (1973) an acquisition "process" exists for grammatical morphemes. In other words, in the acquisition of grammatical morphemes "a considerable period of time elapses between the first appearance of a morpheme and the point where it is almost always supplied in obligatory contexts" (p. 257). Therefore, performance does not abruptly pass from the absence or the low frequency usage of the morpheme to reliable presence. "There is always a considerable period where production where required is probabilistic" (p. 257). Moreover, in agreement with Johnston and Schery's (1976) findings regarding disordered language development, the interval between the emergence of a morpheme and its mastery appears to be much more protracted than in the normal individuals. With regard to our results, this indicates that it is important for us to consider the learning process rather than just the final product.

Our findings were not consistent with the data on normal language development regarding the emergence of the third-person singular morpheme on action verbs first (Bloom, Lifter and Tanouye, 1978; Bloom, Lifter and Hafitz, 1980). The results of this study demonstrated that the specific verb categories, action and state, had no effect upon C.'s acquisition of the subject-verb agreement rule and that C.'s performance was essentially the same for both. This illustrates that normal developmental data may not be relevant for training a particular form with a particular clinical population, that is, the mentally retarded.

The phases of training were presented according to a hierarchy of difficulty and C.'s performance reflected this hierarchy. She responded the best in Phase 1 and the poorest in Phase 3. C.'s level of performance in Phase 2 was between the levels of the other two phases.

During Phase 1, C. appeared to be "cueing in" on the subject number only. This was demonstrated by her inconsistent verbal rehearsal of the subject number by saying for example, "more than one person" or "one person." This linguistic behavior may have contributed to the subject responding correctly over the three initial consecutive trials. Aschcraft and Kellas (1974) found that a "verbal rehearsal strategy" appeared to be a component of memory storage and retrieval. Torgesen and Goldman (1977) found that the failure of learning disabled children to use efficient verbal rehearsal strategies may be an important factor underlying their performance deficiences on memory tasks. Such verbal rehearsal therefore, may have been an uncontrolled variable in this phase of training. Ruder, Hermann and Schiefelbusch (1977) found that comprehension training accompanied by consistent verbal rehearsal resulted in production of syntactic structures with language delayed subjects, while comprehension training unaccompanied by appropriate verbal rehearsal did not facilitate stable production performance. Perhaps then, if the comprehension training was supplemented by consistent and appropriate rehearsal, the subject may have learned how to mark third-person singular subject-verb agreement. When deciding whether a sentence conveyed singular or plural meaning, C. may have understood the sentences by listening for the inflection on the subject-noun rather than the inflection on the verb. Thus, it appears that the verb inflection did not influence C.'s sentential comprehension, but rather the number of the subject-noun served as the effective cue for differentiating the sentence pairs. In Phase 1, C. appeared to ignore the marking of the verb. This was demonstrated by her quick responding, where she would often begin to respond to the sentence before the verb was presented. She frequently began to respond after she heard the subject number which was always presented before the verb. C. did not have to rely on the presence or absence of the verb inflection to respond correctly in the initial phase of training.

During Phase 2 of the experiment, C. exhibited the same type of behavior as in Phase 1. She continued to "cue in" on the subject number and inconsistently verbally rehearsed the number. However, during this phase the verbal rehearsal strategy did not always lead to correct responses. For example, C. would say "more than one" and point to the photograph depicting a singular subject. Further, her responding was inconsistent from trial to trial. She would respond appropriately to the sentence, "The girl likes the furry cat", on the first trial, yet respond incorrectly to the same sentence when presented on a subsequent trial.

During Phase 3, the subject number was deleted from the sentences and C. appeared to begin to "cue in" on the subject-verb agreement rule. She appeared to understand that when the verb is inflected, the sentence's meaning is singular. However, she did not consistently respond to the singular sentences correctly. She often responded to the uninflected verbs in the sentences conveying plurality in much the same way as she responded to the inflected

verbs in singular sentences. Our findings are in agreement with Keeney and Smith (1971) who showed that when the subject is not marked for number, the subject would respond to plural sentences as though they were singular. In their study, as well as ours, when the subject number was unmarked, the subject's performance was better on the singular sentences than on the plural sentences.

C. did not achieve the criterion of 92% correct response for Phase 3. The experimenters attribute C.'s failure to reach the criterion to both the maximum number of trials (12) as well as the difficulty of this phase of training. Keeney and Smith (1971) noted that their children's performances declined when the subject was not marked for number and this type of performance was also found for C.

Although C. performed adequately during Phases 1 and 2 of the comprehension training, testing conducted in the three post-training production tasks revealed that C. had not learned the rule. When the three production tasks were compared, it was found that C. performed the best on the Elicited Production Task. In this task the target verb was provided in its unmarked form and the obligatory context for the verb to be elicited was also provided. It appears that the linguistic context provided in this task may have facilitated correct use of the morphological ending. This linguistic context appeared to restrict the number of alternative responses C. could have given.

In contrast to the Elicited Production Task, the Referential Communication Task and the Spontaneous Language Sampling procedure were closer to natural language contexts. This observation is supported by the low frequency with which C. used the target verbs in these two tasks. Within these natural language contexts, C.'s performance was poor. However, in the Referential Communication Task, C.'s low performance reflected the non-use rather than the incorrect use of the target structure. During this task, C. consistently used the present progressive form. According to Brown (1973) and deVilliers and deVilliers (1973) normal developmental data, the present progressive morpheme /-ing/ is acquired earlier than the third-person singular morpheme /-s/. This suggests that C.'s low frequency of use of the third-person singular morpheme is consistent with the normal developmental model. Interestingly, during the post-training Referential Communication Task, C. correctly coded the third-person singular morpheme on the verbs, "need" and look". Brown (1973) defined these verbs as "state" verbs and it is important to note that such verbs do not take the present progressive. For example, it is ungrammatical to say, "The boy is needing a bath" or "The lady is looking mad". Therefore, it seems reasonable to assume that C. produced the morphological ending with these verbs because of the grammatical constraint that exists for state verbs.

During the post-training in both the Referential Communication and Elicited Production Tasks, the subject produced the third-person singular morpheme on verbs whose subjects conveyed plurality. For example, during the Referential Communication Task, C. said, "The boys needs a bath" rather than "The boys need a bath." Similarly, during the Elicited Production Task, C. said, "rides a bicycle" rather than "ride a bicycle" for a photograph depicting a plural subject. C. spontaneously emitted, "she does sits around"

rather than "she does sit around." According to Slobin (1973) when a child acquires a new grammatical rule he begins to test the hypothesis about when to apply the rule by using it in different contexts. In other words, once a pattern is acquired, it will be applied as broadly as possible, even if this results in the production of ungrammatical forms. Cazden (1968) referred to this type of hypothesis testing as "overgeneralization" and Ingram (1974), believes that the child's overgeneralizations reflect comprehension. Although the differences between the pre- and post-training production baselines were not statistically significant, C.'s production errors which were evidence of overgeneralizations suggest that the comprehension training procedure may have facilitated the hypothesis testing process.

The issue of the relationship between comprehension and production in normal language acquisition has been explored by several researchers. Many have proposed that comprehension precedes production in the course of language development (Lenneberg, 1962; Fraser, Bellugi and Brown, 1963; Lovell and Dixon, 1967; Shipley, Smith and Gleitman, 1969; Nurss and Day, 1971; Mann and Baer, 1971; Fernald, 1972; Asher, 1972; Winitz and Reeds, (1972) Ingram, 1974; Duchan and Erickson, 1976; Petretic and Tweney, 1977; and Ruder, Hermann and Schiefelbusch, 1977). However, in contrast, Keeney and Wolfe (1972) and Chapman and Miller (1975) claimed that production preceded comprehension in language acquisition.

The apparently conflicting evidence suggests that the relationship between reception and production is complex and that broader perspectives are needed if this issue is to be resolved. One possible resolution was offered by Meadow, Seligman and Gelman (1976). In their study they examined linguistic development in children ranging in age from twenty-one through twenty-six months old. These investigators discovered two stages that are involved in the development of noun and verb forms. They identified the first stage as "receptive" because the ratio of words comprehended to those produced was relatively high. The second stage was called "productive" because the ratio of reception to production for a specific form class decreased. Meadow, et al. (1976) found that their subjects progressed from the receptive to the productive stage for nouns during the period of study. However, verbs were not generally comprehended at all until after the child had progressed out of the receptive stage for nouns and at this point, a high-ratio receptive stage for verbs emerged. These authors concluded that reception may precede production during the early stages of acquisition of a particular form, but once mastered, production and comprehension abilities will generally be equal for that class. This conclusion offers a possible resolution of the conflicting claims previously cited by suggesting that the different classes of behavior may have been in different stages of development.

Another possible resolution of the precedence issue has been offered by Bloom (1974) who hypothesized that the gap between understanding and speaking is more apparent than real. There are several interacting factors that contribute to understanding and speaking each representing different mental capacities. Bloom hypothesized that such interactions between factors are different for understanding and speaking, and undergo change in the course of language development. Bloom claimed that comprehension and production

"represent mutually dependent, but different underlying processes with a resulting shifting of influence between them in the course of language development" (p. 286).

In contrast to the previously cited studies, several researchers have claimed that comprehension and production are separate and functionally independent classes of behavior. To determine the efficacy of a comprehension training procedure, Guess (1969) conducted a study with two severely retarded boys, and concluded that the subjects' ability to learn to understand the plural morpheme was independent of their ability to use it. In a follow-up study, Guess and Baer (1973) trained four mentally retarded subjects, ages eleven through thirteen, simultaneously on both comprehension and production of the / s / and / z / allomorphs of the plural morpheme. The purpose of this was to demonstrate the effectiveness of training in one modality, either comprehension or production, for facilitating performance in the other. Generally, the training of plurals both receptively and expressively was successful. However, the data indicated that as a group the subjects exhibited little or no tendency to generalize the plural rules between the modalities. This research indicates comprehension does not necessarily precede production in language development, and furthermore, that comprehension training does not necessarily lead to productive performance. Thus, it seems likely that if some combination of both comprehension and production training were used in the study, the absolute and proportional frequencies of production might have been higher. This assumption is supported by the observation that both imitation and comprehension play a role in the normal language acquisition process and in language training. The studies conducted by Fraser, Bellugi and Brown (1963) Lovell and Dixon (1967), Nurss and Day (1971) and Fernald (1972) have shown that both imitation and comprehension are part of normal language development in that imitation appears to precede the comprehension of grammatical structures.

Ruder, Smith and Hermann (1974) examined the effects of imitation training and comprehension training on the production of lexical items by preschool subjects. They found that imitation training did not result in production. However, imitation training on those items that were initially trained through comprehension resulted in 100% production prior to use in the imitation-then-comprehension training sequence. Thus, the authors found that comprehension training followed by imitation training resulted in production of all items. In a follow-up study, Ruder, Hermann and Schiefelbusch (1977) set out to determine whether both imitation and comprehension components were necessary for older children to acquire production abilities and if so, whether one sequence of training, that is, comprehension followed by imitation or imitation followed by comprehension, was preferable to the other. Their results were in agreement with Ruder, Smith and Hermann's (1974) findings that initial comprehension training followed by imitation training resulted in production. While all the subjects in this study attained some production during the initial comprehension training, the data also showed that there was considerable improvement in the production probes once imitation training was instituted. The subjects required considerably less training to achieve the 100% performance level when imitation followed comprehension training. These results concur with the findings from the previously mentioned studies conducted by Mann and Baer ((1971) and Ruder, et al. (1974) which showed that prior comprehension training has a facilitating effect on subsequent imitation

training of the same items. The results of the initial imitation training on production indicated that there was no systematic increase in correct productive responding as imitation ability increased. These results seem to indicate that initial imitation training may have interfered with subsequent comprehension training. The findings further suggest that the sequence of comprehension training followed by imitation training is more efficient in achieving both comprehension and production of lexical items than is the reverse sequence of imitation training followed by comprehension training. The results of these two studies support the notion that some combination of both comprehension and imitation training is more efficient in facilitating production than comprehension alone. Therefore, as noted earlier, if a combination of comprehension and imitation training were used in this study, the absolute and proportional frequencies of C.'s use of the third-person singular morpheme might have been higher.

A final issue which bears on the results of this study is the critical age hypothesis (Lenneberg, 1967). According to Lenneberg, language develops when a certain level of physical maturation and growth has been attained. Due to an interaction of maturation and self-programmed learning, language emerges between the ages of two and three. Lenneberg believes that between the ages of three and fifteen, the possibility for primary language acquisition continues because this is the critical period for language development. However, beyond this period, a human being will be incapable of acquiring a first language. In other words, "basic language skills not acquired by that time, usually remain deficient for life" (p. 158). According to this view C. did not acquire the morphological rules during the critical period and for this reason, they have remained deficient and also resistant to remediation.

Since this study does not present conclusive evidence, future research is needed to investigate the issues raised as well as to examine the responses of other mentally retarded adults to this training procedure. Through this we may be better able to determine more specifically where the deficiences of mentally retarded adults are, the range of such impairments and how they interact. Only with such knowledge will we be able to design appropriate intervention programs so that the potential of these adults will be maximized.

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Appendix

Verbs by semantic category (action or state) and allomorph (/s/ or /z/)*

Semantic Category

Allomorph	Action	State
/s/	eat	want
	write	like
	talk	look
/z/	ride	need
	read	feel
	build	love

Training Sentences**

Verb	Singular	Plural
1. Want	The boy wants brand new shoes.	The boys want brand new shoes.
2. Like	The girl likes the furry cat.	The girls like the furry cat.
3. Look	The lady looks very mad.	The ladies look very mad.
4. Need	The boy needs a warm bath.	The boys need a warm bath.
5. Feel	The girl feels very tired.	The girls feel very tired.
6. Love	The lady loves the new dress.	The ladies love the new dress.
7. Eat	The girl always eats ice cream.	The girls always eat ice cream.
8. Write	The girl always writes letters.	The girls always write letters.
9. Talk	The lady always talks on the phone.	The ladies always talk on the phone.
10. Ride	The boy always rides a bike.	The boys always ride a bike.
11. Read	The lady always reads the newspaper.	The ladies always read the newspaper.
12. Build	The boy always builds a house.	The boys always build a house.

* All verbs were used during the training phases, while eight of them were used during the pre and post elicited production task and referential communication task baselines.

** All sentences were used during each phase of training.

Early Emergence of a Verbal Inflection: Semantic and Pragmatic Considerations

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Abstract

This study investigated the early emergence of a verbal inflection in a language impaired child. Semantic and pragmatic variables were examined in training a grammatical morpheme. Specifically, the influence of the semantics of verb aspect was explored. Pragmatic considerations involved an analysis of nonlinguistic contexts for reporting of a past event. The results focused on the interrelations of the semantic and pragmatic factors and were discussed in terms of clinical implications and future research.

The traditional approach to the acquisition of morphological inflections in normal child language has been concerned primarily with syntactic or formal aspects of development. Accordingly, Cazden (1968), Brown (1973), and deVilliers and deVilliers (1973) have stated that there is a uniform order of acquisition in which grammatical morphemes normally develop. Johnston and Schery (1976), found that children with severe oral language disorders acquired the 14 morphemes in much the same order as Brown's (1973) three normal children. However, the language-deficient children moved at a slower rate from first use of a morphological rule to its consistent general application.

Bloom, Lifter, and Hafitz (1980) found that the verb inflections ing, -s, irregular/-ed emerged simultaneously in the children's speech but were distributed selectively with different populations of action verbs. They suggested that the emergence of morphological endings is dependent on the semantic organization of the children's verb systems. They found that the semantics of verb aspect appeared to guide the emergence of the inflectional forms. That is, children coded the aspect of the verb before the tense, and the verb aspect served to motivate the emergence of the morphemes. Aspect and tense are both temporal relations. Aspect was defined as the temporal contour of a particular event with regard to continuous versus momentary action. Verbs which inherently described continuous actions (e.g., run) were referred to as durative verbs. Verbs which inherently described momentary actions (e.g., break) were termed nondurative verbs. Lexical aspect can also be described intuitively in terms of whether the events the verbs name are completive, (e.g., having a definite end point such as "throw", or noncompletive, can go on indefinitely or be broken off at any point such as "sing". In contrast, linguistic tense is a deictic relation between the event time (the time an action or state occurs) and the speech time (the time when an utterance that refers to that event occurs).

While it is postulated that children code aspect before tense, Bloom, Lifter and Hafitz (1980) stress that this is not an absolute principle. Children who are first learning inflectional morphemes are most influenced by event aspect, however, they are learning tense relations at the same time. In analyzing their data, Bloom et.al. (1980) found that the -ing marker

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emerged almost exclusively on durative/noncompletive verbs such as "play", "hold", "ride", and "write". Nondurative events describing completive events with a relatively clear end result (e.g., "find", "fall", and "break") were marked by irregular/-ed. The most frequent verbs that occurred with -s named events that were both durative (in the sense of continuing after completion) and completive with an end result as in the events "fit", "open" and "sit".

Additional studies by Ferreiro and Sinclair (1971), Bronckart and Sinclair (1973) and Antinucci and Miller (1976) have investigated the role of verb aspect in the acquisition of grammatical morphemes. Ferreiro and Sinclair (1971) examined four to ten year old French speaking children's capacity to produce sentences which express a temporal order relationship between two events. They found that the youngest subjects did not attempt to indicate a temporal relationship between two events as the older children did. Verb tenses instead were used to indicate the temporal contour of each separate event. Bronckart and Sinclair (1973) demonstrated that aspectual factors exerted an influence on the use of verb forms by 74 French speaking children between the ages 2.11 and 8.7. The children had to describe actions which differed in type of result, frequency and duration. That is, some actions led to a clear result, others did not: some actions were repetitive, others were not, and some actions were almost instantaneous, others were not. They found that the type of result influenced the choice of the verb forms for all subjects. Actions that obtained a clear result were generally described in the past perfect and actions that did not lead to any result were described in the present. The authors hypothesized that the longer it takes to complete an action, the more probable it becomes that the child will focus on the action, and hence use the present tense. If the action gives an immediate result, the use of the past perfect is most likely because the child can only focus on the result. They found that after age six, the children used different verb forms to express temporal relations, much like the adult would. Antinucci and Miller (1976) examined the longitudinal records of the speech of eight children as they developed from 1.6 to 2.6 years. With regard to the past tense grammatical morpheme, the authors claimed that the appearance of the inflected past tense is by no means haphazard. They showed that children can only refer to and encode past events when their character is such that they result in a present end-state of some object. Verbs which described an event without an end result were never used in the past tense in the children's speech although they did occur in the present tense.

The aforementioned studies investigated the role of verb aspect in the early emergence of grammatical morphemes in children's speech. It is believed that aspectual factors exert an influence on the development of the inflections. Specifically, with regard to the tense markers, in the early stages verb aspect seems to determine how the verbs are inflected.

In addition to the role of verb aspect, recent approaches to the study of communication acquisition have suggested the importance of pragmatic considerations. Bloom and Lahey (1978) delineated various stages of pragmatic development and sensitivity to context which co-occur with semantic/syntactic development. Specifically, they described the gradual development of the

ability to talk about the objects and events that are removed in time and space from the immediate situation. Thus, in examining the emergence of morphological inflections in child language, it may be necessary to consider the role of semantic and pragmatic factors. The implication by Johnston and Schery (1976) that language disordered children display a delay rather than a deviance, may justify the application of linguistic theories and hypotheses regarding the normal child to the language delayed child.

The present study has considered both semantic and pragmatic factors in the early training of the irregular past tense morpheme with a language impaired child. The purpose of this study was essentially two-fold. First, to determine whether the semantics of verb aspect influences the early emergence of the irregular past tense in a language impaired child. Second, to investigate the pragmatic variable of non-linguistic context in relating a past event by manipulating a) the event time in relation to the speech time and b) the type of context in which the event was reported.

Method

Subject:

S. was a 5.3 year old male whose language development was significantly delayed. Initial evaluation at the Queens College Speech and Hearing Center revealed a severe language disorder. S. had a limited productive vocabulary characterized primarily by single word utterances and short stereotypic phrases. His conversational speech was almost completely unintelligible as he displayed multiple articulation errors.

S. was born prematurely and had jaundice as an infant, but little information was known regarding his early developmental history as S. was separated from his mother at age two. At the time of the study S. lived with foster parents.

S. had been receiving therapy at the Queens College Speech and Hearing Center for three semesters. Initially, speech/language goals involved the development of cognitive schemata underlying basic semantic relations, and the mapping of linguistic forms onto these cognitive structures. S. was also taught to respond appropriately to "wh" questions and to encode question forms. Subsequent goals of therapy included the expansion and coordination of semantic-syntactic relationships. With regard to use, therapy focused on the descriptive use of the "here and now" as well as on reporting events.

Prior to this study, speech and language functioning was assessed using the Bloom and Lahey method of analysis (1978). It was noted, that with regard to content categories, S. appeared to be functioning between phases three and four and had begun to coordinate many of the basic semantic-syntactic relations. His mean length of utterance was 3.05. With regard to use, S. had begun to use language to describe objects and events that were not immediately present. With respect to tense, S. had begun to encode time concepts such as intent, specifically "wanna" and "gonna". Some evidence of past tense had been noted on proverbs e.g., "did", "got", and "made".

Interestingly, there were no productions of the present tense "-ing". This is discrepent with the order of acquisition suggested by Brown (1973), where "-ing" was the first marker to appear.

Apparatus:

Experimental activity contexts were performed in two rooms at the Queens College Speech and Hearing Center, each approximately 8' x 10'. Reporting contexts were conducted in both the hallway and a therapy room. A portable audio cassette recorder was used to record the subject's utterances. Materials used in the experimental procedure are in Appendix A and B.

Procedure:

Two experimenters were present throughout the experimental procedure. The subject and the first experimenter varied their positions with respect to the given activity context. A second experimenter, who was seated at a table facing the subject and first experimenter, recorded all data and noted the time frames of the procedure. A cohort was available in an adjacent room to take part in the reporting task.

Baseline:

Prior to the commencement of the experimental procedure, several baselines were administered. First, the subject was required to articulate the eight training verbs listed in Appendix A in both the present and past tense forms. The purpose of this phonological baseline was to determine whether the subject's articulation of the verbs was clear enough to differentiate the present from the past tense forms. The child's responses were audio-taped and assessed by two independent judges. Second, the subject was presented with each (durative) activity context in order to insure that he could maintain play interactions for at least one and a half minutes, the maximum amount of time required by the experimental procedure. Third, a language sample was collected to determine whether the child spontaneously encoded the eight training verbs in the present and past tense. (See Appendix A for activity contexts used). Finally, the eight training verbs were baselined to determine whether the subject encoded the past tense forms in obligatory contexts.

The child and experimenter engaged in naturalistic play contexts of durative and nondurative activities. (See Appendix A.) The activity contexts were presented in random order, and in each case the child was given an adult model of the activity and the verb in its present tense form (e.g., "I ride car"). The child's verbalizations during the activity were transcribed. In the case of a durative activity, the child was required to engage in the activity for a minute and a half (e.g., ride). For a nondurative verb, the subject was allowed only enough time to complete the activity (e.g., "bite").

Upon completion of the activity, a ten second clean-up period was instituted. The subject and the experimenters then left the site of the activity to further remove the subject from the past event. The child was

required to relate his past actions in two reporting contexts presented in random order. The first reporting context occurred thirty seconds post-activity completion, and the second reporting context took place 120 seconds after completion of the activity. One context consisted of two toy telephones, one for the subject and one for the cohort. The cohort presented the elicitation phrase "Can you tell me the story?" or "Can you tell me about the game?". To obtain additional responses, the cohort replied: "What?" or "I can't hear you, say it again". The second reporting context consisted of two small notebooks for story recording. In this context, the same stimulus phrase was used to obtain the responses. The experimenter recorded the "stories" which were entered once in a "book for Mommy" and once in a "book for Daddy".

Using both reporting contexts, there was a total of four possible subject responses. The child's responses and contextual data were transcribed. A token reinforcement system was used. After each report the subject received a star which was later exchanged for edibles.

Training:

The training procedure was limited to a defined time period and did not attempt to reach a pre-defined acquisition level. This decision was in keeping with the normal acquisition process where in developing verbal inflections, the normal child only gradually begins to mark the past in obligatory contexts. In this sense, acquisition is process oriented rather than product oriented. Furthermore, the distinctions suggested by Bloom, Lifter, and Hafitz (1980) are evident only in the earliest emergence of the verbal inflections. The training procedure utilized elicited imitation. According to Bloom, Hood, and Lightbown (1974), "Children imitate only words and structures in the speech that they hear which they appear to be in the process of learning". (p.416)

Eight training verbs, four durative noncompletive and four nondurative completive were selected from Bloom, Lifter and Hafitz's (1980) classification of durative/nondurative verbs. (See Appendix A). Six of the verbs chosen for training were among those listed as "best instances". However, the other two verbs, one durative (write) and one nondurative (throw) were listed among the "marginal instances". Bloom et al. (1980) define "best instances", as those verbs which were clear in their reference to completive/nondurative actions and noncompletive/durative actions. "Marginal instances" were those verbs which named events that were only approximately completive/nondurative or noncompletive/durative and occurred in either type of event.

The training procedure involved three phases which differed in the number of adult models provided. Each phase was completed in two days, training four verbs per day in two contexts each. The presentation order of the verbs was randomized. Each day prior to the onset of the first activity, the child was informed that he was to play various games in the room and then go and "tell the story about them". The reinforcement contingency was also explained, and the subject was shown the final reward. Activity procedures used for all training phases were identical to those described above for the verb baseline. Reporting procedures were also identical to

the those for the verb baseline except that adult models of the past tense forms were provided. Specifically, after the cohort presented the elicitation phrase, the experimenter modeled the verb in its past tense e.g., "I rode car". The subject then responded with an imitation of the adult model.

Training Phase I: Reporting for phase I provided a total of four adult models and four child responses per verb.

Training Phase II: This phase was carried out in the same manner as Phase I with the exception of the number of adult models of the past tense forms. In each reporting context the adult provided only one model, reducing the total number to two. A new activity context as well as a phase I context was used to train each of the eight verbs.

Training Phase III: Phase III was identical to phases I and II except for the further reduction of the number of adult past tense models. One adult model was provided in the first reporting context only. (The order of contexts was randomly determined). Again, one new activity context and one previously used from phase I were included.

Two weeks post-training, a language sample was taken, and pre-training baselines were re-administered.

Results

The pre-training language sample and pre-training verb baseline revealed that S. did not use the irregular past tense training verbs in obligatory contexts. Generally, the irregular past tense was substituted by the present tense of the verb or by a proverb in the past tense.

A comparison of pre- and post-training baselines and language samples revealed that production of increased from 0% to an average of 16.2%. Post-training data indicated seven spontaneous instances of the irregular past tense. Analysis of S.'s performance on the durative versus nondurative verbs revealed a difference between the two verb types. A training phase I production for the nondurative verbs exceeded the durative verbs by 25%. Pre- and post-training results indicated increased production from 0% to an average of 4.16% for the durative verbs and to an average of 12.16% for the nondurative verbs.

With regard to the pragmatic variables (i.e., the type of reporting context and the reporting context)a difference was noted in the performance for the durative verbs only. Post-training results indicated better performance (by 12.5%) when the report occurred 120 seconds rather than 30 seconds post activity. Reporting results were also increased (by 12.5%) in the phone context rather than the storybook context.

Discussion

The present study examined the role of semantic and pragmatic variables in the early training of the irregular past tense to a language impaired child.

Post-training results indicated that the irregular past tense morpheme had begun to emerge and had become productive for S. According to Bloom and Lahey (1978), meeting a criterion of productivity provides evidence that a language behavior is systematic and is a product of the child's language system. A criterion of at least four utterances was suggested as a criterion reference for productivity. Thus, S.'s seven productions of the irregular past tense met the criteria for productivity.

With regard to the semantics of verb aspect, a difference in performance on the durative versus nondurative verbs was noted only in the first phase of training. As the results indicated, performance on the nondurative verbs was somewhat better than on the durative verbs. This appears to be consonant with Bloom, Lifter and Hafitz's (1980) findings that the past tense marker appeared first on nondurative verbs in its earliest emergence. They found that in the early stages of development, the verbs were marked according to the inherent aspectual meaning of the individual verbs.

In terms of the pragmatic aspects of this study, the data suggests some interesting findings. The first issue explored in this study involved the manipulation of the time the report of the event was given in relation to the time the event occurred. As the post-training results indicated, the time factor made no difference for the nondurative verbs. For the durative verbs there was a marked improvement in S.'s performance when the report occurred 120 seconds post activity. This may indicate that for the ongoing, noncompletive verbs, this child needed more time to elapse post activity before he was able to encode it as a past event. Thus, the data suggests an interaction between verb aspect and the pragmatic consideration of the time of the report. This result is consistent with Bronckart and Sinclair's (1973) hypothesis that the longer it takes to complete an action, the more likely it is that the child will focus on the action itself and thus use the present tense rather than the past tense. However, they found that if action yielded an immediate result the child often focused on the result and was likely to encode it in the past tense.

The second pragmatic aspect of this study involved the manipulation of the type of context in which the event was reported. As the post-training results indicated, for the nondurative verbs, there was no difference in performance between the two reporting contexts. However, for durative verbs, varying the reporting contexts had a marked effect on S.'s performance. The telephone context seemed to facilitate the subject's encoding of the durative actions as past events. Thus, an interplay between pragmatics and semantics was again evident. Bloom and Lahey (1978) posit that nonlinguistic context influences language learning in normal children, and may influence the ease with which language disordered children learn certain aspects of language. They advocate careful planning of the non-linguistic input in order to facilitate language learning in a formal teaching situation.

In summary, this study indicated that the semantics of verb aspect influenced the early emergence of a verbal inflection. The distinction between the durative/nondurative aspect of verbs was an important one in training the past tense to this language impaired child. With regard to

pragmatics, there were differences in performance with variations in time and context as factors. Moreover, the results suggest evidence for the interaction of semantic and pragmatic variables.

The study's results suggest several clinical implications. First, the distinction between durative and nondurative verbs should be considered when selecting verbs and activities presented in the early training of a verbal inflection and the past tense. The non-linguistic demonstration of the verb should reflect its nondurative nature. Second, one could optimize conditions for encoding the past via manipulation of the nonlinguistic contexts. Particular attention should be paid to the temporal relations between the event the child experienced and his report of it. The clinician should allow sufficient time to elapse after the termination of an event before asking the child to describe it. Contextual preferences for reporting the event should also be considered to facilitate the coding of the past. Finally, this study suggests the need to integrate semantic and pragmatic variables in the training of syntactic forms.

Future research should be directed toward continued systematic investigations of several variables identified in this study, such as physical and temporal distancing of a child from the past event. Furthermore, while this study involved the training of a morphological inflection to a language impaired child, subsequent research designs might include naturalistic longitudinal studies to observe how morphological inflections emerge in the language impaired child.

Appendix A

VERB CONTEXTS

		VERB	LANGUAGE SAMPLE	PRE-TRAINING BASELINE	POST-TRAINING BASELINE
D	1.	Held	pulley toy	doll	doll "thumb" game
ND	2.	Bought	candy	food	food sneakers
ND	3.	Bit	monster(hand)	puppet(ear)	puppet(ear) puppet(nose)
D	4.	Slept	doll(crib)	wagon	wagon sleeping bag
D	5.	Rode	train(grey)	plane	plane scooter
ND	6.	Threw	rubber darts	ring toss	ring toss hat
ND	7.	Tore	magazine	paper bag	paper bag coloring book
D	8.	Wrote	ABC letters	circle	circle "CAR"

Key: D=Durative Verb
ND=Non-durative Verb

Appendix B

VERB CONTEXTS (TRAINING)

	VERB	PHASE I	PHASE II	PHASE III
1.	Held	ball on spoon "thumb" game	person "thumb" game	hands ball on spoon
2.	Bought	assorted toys pet shop	pet shop cookies	sneakers assorted toys
3.	Bit	puppet(nose) puppet(finger)	puppet(finger) puppet(leg)	puppet(leg) puppet(nose)
4.	Slept	table bed(sheets	sleeping bag bed(sheets)	couch table
5.	Rode	scooter chair with wheels	chair with wheels car	train(red) scooter
6.	Threw	ball frisbee	ball air plane	hat frisbee
7.	Tore	paper paper napkin	paper napkin newspaper	coloring book paper
8.	Wrote	letter number	name letter	"CAR" "name"

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The Effect of Age on the Prediction of Hearing Levels From Acoustic Reflex Thresholds in Persons With High-frequency Hearing Losses

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Abstract

This study investigated the effects of age on the predictive accuracy of high-frequency hearing losses by comparing matched groups of old and young, normal and hearing impaired subjects. The results revealed that there was a relatively clear separation between normal hearing and high-frequency hearing loss subjects such that a line could be drawn which separated the groups with 80% accuracy. Age did not significantly affect reflex thresholds; however, a slight elevation in white noise thresholds for the older subjects served to shift their position slightly to the right of the younger subjects on the bivariate plot. Also, the two methods of plotting bivariate data (one plot versus three plots) were compared. It was found that both methods demonstrated equal overall predictive accuracy, but the one plot method resulted in a lower false negative rate. Finally, recommendations were made for the modification of both procedures.

The past decade has seen the introduction of several methods for predicting hearing levels from acoustic reflex thresholds (Niemeyer and Sesterhenn, 1974; Jerger, Burney, Mauldin and Crump, 1974), the most recent of which is the bivariate plotting procedure (Popelka, Margolis and Wiley, 1976). All three procedures are based upon the relationship between acoustic reflex thresholds (ARTs) for pure tone (PT) and broad band noise (BBN) stimuli, which has been shown to differ between normal and sensorineural ears. BBN ARTs are elicited at levels approximately 20 dB lower than for PT ARTs (Deutsch, 1972). This has been related to the loudness summating properties of the ear (Jerger et.al., 1974). Sensorineural ears, however, are characterized by abnormally wide critical bandwidths for loudness such that greater intensities than normal are required to elicit a reflex to BBN, thus reducing the difference between PT and BBN ARTs (Jerger et.al., 1974). Niemeyer and Sesterhenn (1974) used this information to provide an estimated pure tone average, while Jerger et.al., (1974) classified hearing as normal, mild-to-moderate, severe or profound, and estimated the slope of the loss. The bivariate plotting procedure (BPP) offers a more conservative approach in that it purports to separate normal from impaired ears without providing an estimate of the severity of the loss.

In a comparison of these three methods, Margolis and Fox (1977) found that the two former procedures suffered from high false positive rates (i.e., frequently predicting hearing loss in normal ears), whereas the BPP, although providing less information regarding the degree of loss, more accurately separated impaired from normal ears. The superior accuracy of the BPP has been attributed to the fact that this procedure takes into

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account not only the ratio of BBN to PT ARTs (represented along the abscissa), but also the absolute sound pressure level of the reflex thresholds to PTs (represented along the ordinate). In impaired ears, the ratio of BBN to PT activated reflexes is closer to one (1.0) than in normal ears, and the absolute sound pressure levels required to elicit PT ARTs are higher. As a result, when this information is plotted, there is a clear separation between the coordinates representing normal and impaired ears.

In a recent study, Silman and Gelfand (1979) noted that in the existing bivariate data, hearing loss has been operationally defined as "an average loss of $\geq$ 32 dB HTL (ANSI-1969) for the 'speech frequencies' without regard to the audiometric contour or to the thresholds at higher frequencies." This led them to conclude that "there is no way to rule out high-frequency hearing loss as a confounding variable in those adults for whom reflex-based methods of hearing loss prediction are needed" (p. 693). They further suggested that the presence of a high-frequency hearing loss might confound the results by reducing the effectiveness of the BBN reflex activator. This would reduce the difference between PT and BBN ARTs to a level typical of sensorneural ears, so that a patient classified as normal with reference to the speech frequencies might be identified as impaired on a bivariate plot due to the confounding effect of a high-frequency hearing loss.

The findings of the Silman and Gelfand study revealed that while the procedure was successful in separating normal from moderately and severely impaired ears, accuracy was significantly reduced in the prediction of high-frequency hearing loss as normal and 59% as impaired. These results are consistent with those of previous studies (Handler and Margolis, 1977; Jerger, Hayes and Anthony, 1978a) which found lower accuracy of prediction for high-frequency hearing losses.

Upon closer examination of these studies, one finds a common flaw in that there is no control for the age of the subjects. Typically, the group of normal hearing subjects is composed of primarily young persons (e.g. in Silman and Gelfand's data, mean age = 28), while the impaired group is significantly older (e.g. mean age = 51.5) or else the age of the impaired group is not stated at all (Handler and Margolis, 1977; Margolis and Fox, 1977). One cannot rule out the confounding effect of age in light of the fact that previous research (Jerger et al., 1978a; Silman, 1979a) has demonstrated that the relationship between reflex thresholds for BBN to PTs changes as a function of age. Silman (1979a) has attributed this to an increase in BBN ARTs while PT ARTs remain constant, while Jerger et al. (1978b) have related it to a decrease in PT ARTs with age while BBN ARTs remain the same. In either case, the result is that the difference between BBN and PT ARTs becomes smaller, so that the ratio of BBN to PT ARTs approaches one (1.0), which, as noted above, is similar to the ratio seen in sensorineural ears.

The primary purpose of this study is to examine the extent to which age affects the accuracy of the prediction of hearing levels in persons with high-frequency hearing loss. If one continues to accept the definition of hearing loss as a loss equal to or greater than 32 dB HTL

in the speech frequencies, then one would expect that the patient with a high-frequency hearing loss would be predicted as having normal hearing; yet, as has been shown, a large proportion of those patients are predicted to have a hearing loss. The question to be answered is: Can the "misclassification" of high-frequency hearing loss patients as hearing impaired be explained by their age, i.e. are older subjects more often classified as impaired?

If the primary confounding variable is age, then it might be possible to use the BPP on a "young" population. Specifically, this objective measure could prove a valuable addition to a test battery for nonorganic hearing loss. Silman and Gelfand (1979) pointed out that compensation suits are frequently based upon damage due to excessive noise exposure, which indeed often causes a loss in the high frequencies, but may leave the speech frequencies unimpaired. If the plotting procedure could reliably classify such a patient as normal, cases of exaggerated thresholds could be quickly and easily identified.

A secondary focus of this study is a comparison of the two suggested methods for plotting bivariate data. Silman and Gelfand (1979) used a one plot method in which the mean PT ART (for 500, 1000 and 2000 Hz) is represented along the ordinate and the ratio of the white noise ART to the mean PT ART is along the abscissa. Another method which has been used (Margolis and Fox, 1977; Handler and Margolis, 1977) consists of three plots, which utilizes individual PT ART data along the ordinate, and ratios based on either low-pass or high-pass filtered noise on the abscissa. A subject is judged to have normal hearing if he falls in the normal region on at least two out of the three plots.

The literature has shown that both methods yield highly accurate results, but the two methods have yet to be formally compared. The one plot method would appear to be the method of choice as it is quicker and easier because fewer data need be gathered and analyzed. However, the three plot procedure would be advantageous if it could provide frequency-specific information. Popelka et. al. (1976), for example, used four plots (PT ARTs of 500 - 4000 Hz with low and high frequency noise bands) and found that subjects with high-frequency hearing loss performed differentially on each plot. On the 500 Hz plot, there was a good deal of overlap with the normal hearing subjects. The separation between normal and hearing impaired subjects became more pronounced at successive frequencies so that at 4000 Hz there was a clear division between the two groups. While this sounds promising, it should be noted that Margolis and Fox (1977) were unable to derive any frequency specific information from their plots.

In this study, data were plotted in accordance with both methods in order to determine: a) if one method more accurately separates normal from hearing impaired ears and b) if frequency-specific information can be derived from the three plot method, which could be particularly important in the prediction of high-frequency hearing loss.

Method

Subjects:

There were fourteen normal hearing subjects, ranging in age from 21 - 60 years (mean = 43). Each subject had air conduction thresholds no poorer than 25 dB HTL (ANSI-1969) at any frequency from 250 - 8000 Hz.

A second group consisted of fifteen hearing impaired subjects, ranging in age from 20 - 66 years (mean = 46). Each subject had a pure tone average of $\geq$ 30 dB HTL, but had a loss of $\geq$ 40 dB HTL at 2000 Hz or above. These ears met the criteria for high-frequency hearing loss used by Silman and Gelfand (1979).

Both groups of subjects met the following criteria: air-bone gaps of $\geq$ 10 dB at all frequencies, normal tympanometry in the probe ear, and a measurable acoustic reflex to a BBN stimulus.

Both ears for all subjects were used whenever the criteria were met, for a total of 24 ears in the normal hearing group and 26 ears in the hearing impaired group.

In order to investigate the effect of age on the BPP, both the normal and hearing impaired subjects were divided into young and old groups. Because the mean age for all subjects was 44.10 years, it was decided that subjects aged 20-44 years would constitute the "young" groups, and subjects aged 45 - 66 years would make up the "old" groups. The means, ranges and standard deviations of the hearing thresholds levels for the four groups are presented in Table 1.

Apparatus:

Pure tone thresholds were obtained on a standard clinical audiometer (Grason-Stadler 1701 with TDH-49 earphones in MX-41/AR cushions) or on a portable audiometer (Beltone 10D with TDH-39 earphones in MX-41/AR cushions). An electroacoustic impedance bridge (American Electromedics 83) with a probe tone frequency of 220 Hz was used to obtain tympanograms. The bridge was also used to generate the reflex activating signals. The signals consisted of pure tones of 500 Hz, 1000 Hz, 2000 Hz, 4000 Hz and unfiltered white noise (WN), low-pass (LPN) and high-pass (HPN) filtered noise, all of which were shaped by the earphone (TDH-39 in an MX-41/AR cushion). An octave spectrograph of the WN can be found in Figure 1 and one-third octave spectrographs of the LPN and HPN are shown in Figures 2 and 3 respectively. Acoustic reflexes were inferred from changes in compliance of the contralateral ear as measured on the compliance change meter of the impedance bridge.

Calibration of the audiometers and of the reflex activating signals was completed using a sound level meter (Bruel and Kjaer Type 2203 with a 1613 filter set) and coupler (Bruel and Kjaer Type 4152 artificial ear.

Table I

Means, ranges and standard deviations of pure tone hearing threshold levels (in DB HTL) for young and old, normal hearing impaired subjects.

Group	N (# ears)	$\bar{X}$ Age (ears)		250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
YOUNG NORMAL HEARERS	12	29.10	$\bar{X}$	6.7	3.3	5.0	2.9	5.0	6.2
			Range	0-15	0-15	0-15	0-20	0-15	0-20
			S.D.	4.9	4.4	4.3	5.8	5.2	5.4
OLD NORMAL HEARERS	12	52.4	$\bar{X}$	4.6	1.7	1.7	3.3	10.4	9.2
			Range	0-15	0-10	0-10	0-15	0-25	0-25
			S.D.	5.8	3.3	3.3	4.4	7.2	7.3
YOUNG HEARING IMPAIRED	12	34.0	$\bar{X}$	7.1	7.1	11.2	33.3	51.2	42.1
			Range	0-20	0-15	0-30	0-60	35-75	15-75
			S.D.	5.8	5.4	9.6	16.7	14.6	20.4
OLD HEARING IMPAIRED	14	56.6	$\bar{X}$	9.6	9.3	9.3	32.1	52.5	52.5
			Range	0-15	0-20	0-20	5-65	40-65	35-75
			S.D.	5.4	5.1	7.0	16.8	8.5	12.8

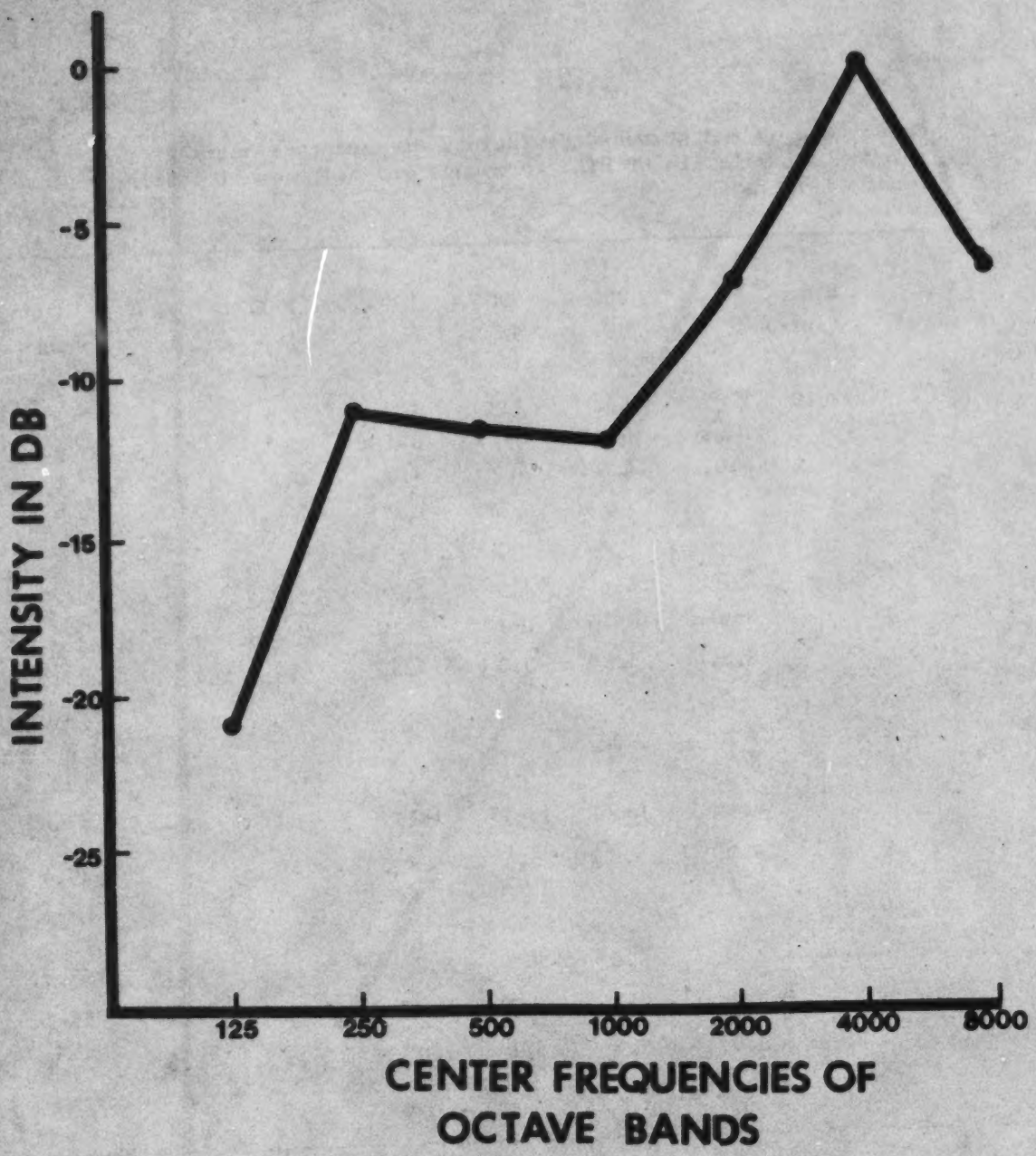

Figure 1. Octave spectrograph of the whie noise stimulus.

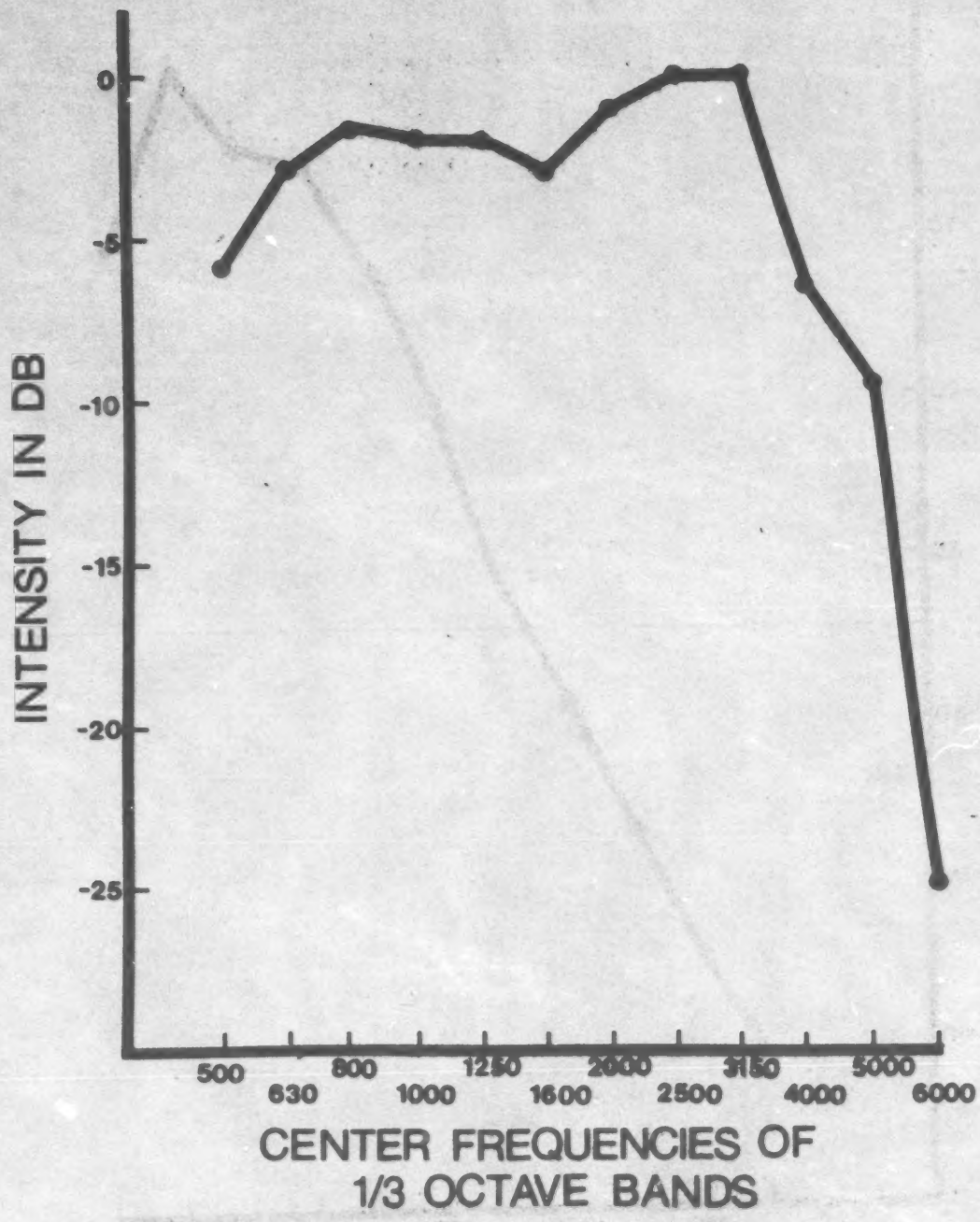

Figure 2. 1/3 octave spectrograph of the low-pass filtered noise stimulus.

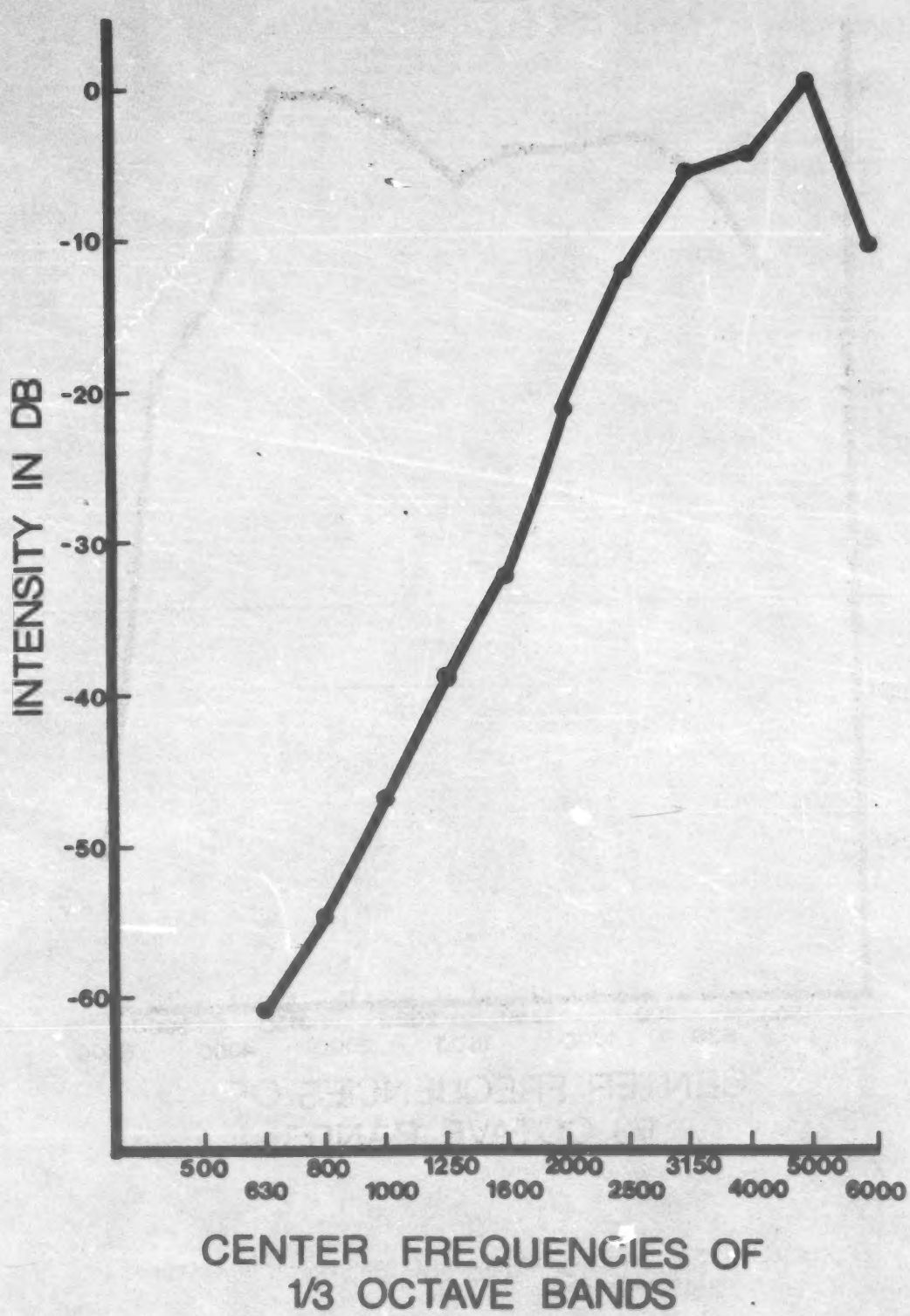

Figure 3. 1/3 octave spectrograph of the high-pass filtered noise stimulus.

Procedure

Pure tone testing was completed in order to establish if the subject met the hearing level criteria for this study. Following this, the earphone was placed over the test ear, and the impedance probe was sealed into the contralateral ear. Tympanograms were obtained with the sensitivity setting on "T". The setting was then changed to "R" and acoustic reflex activating signals were presented in the following order: 500 Hz, 1000 Hz, 2000 Hz, 4000 Hz, WN, HPN, LPN. Signals were delivered beginning at 65 dB HTL for pure tones and 65 dB SPL for the noise stimuli, and were raised in 5 dB steps until a reflex was observed. Intensity was then lowered by 10 dB, and an ascent in 5 dB steps was initiated until a reflex was again observed. The lowest intensity level at which a repeatable reduction in compliance occurred was recorded as the reflex threshold.

Results

The means, ranges and standard deviations of the PT and WN ARTs for the four groups are presented in Table 2. Mean PT ARTs for the two normal hearing groups were identical at 1000 Hz and 2000 Hz; were approximately 3 dB lower for the "old" group at 500 Hz and 4dB higher at 4000 Hz. Mean PT ARTs for the hearing impaired (HI) groups were within 1.3 dB of each other at 500 - 2000 Hz and 11.7 dB higher for the "old" group at 4000 Hz. PT ART levels at 500 Hz and 1000 Hz were quite similar among all four groups; however, an elevation in the reflex levels may be noted at 2000 Hz and 4000 Hz for the HI groups which is consistent with the presence of a hearing loss at these frequencies.

WN ARTs for both "old" groups were approximately 3 dB higher than those of their respective "young" groups, which was not significant as shown by a t-test ($p > .05$). There was, however, a statistically significant difference of approximately 10 dB between the mean WN ARTs of the normal hearing and HI subjects ($t = 3.327$; $df = 22$; $p > .01$ for the "young" groups. $t = 3.756$; $df = 24$; $p > .01$ for the "old" groups).

Silman (1979a) studied the effect of age on ARTs in normal hearing subjects using a "young" group aged 21 - 36 years and an "old" group aged 60 - 76 years. He also reported the results of a study by Wilson (reported in a personal communication to Silman, 1979b) which compared young normal subjects aged 20 - 30 years with elderly normal subjects aged 50 - 60 years. In order to make the present experiment more comparable to those studies, mean ARTs were averaged for normal hearing subjects aged 20 - 30 years ($n = 6$ ears) and compared to mean ARTs of normal hearing subjects aged 50 - 60 years ($n = 8$ ears). Results revealed mean WN ARTs of 86.5 dB SPL for both groups and nearly identical mean PT ARTs of 94.99 dB SPL for the "young" group and 95.04 dB SPL for the "old" group.

The ART data for both groups were plotted in Figure 4 in accordance with the BPP as described by Silman and Gelfand (1979). Two intersecting line segments were drawn to separate normal from HI ears. The lines can be described by the equations $x = K1$ and $y = -x + K2$. The values of K1 and K2, 94.5 and 189.5 respectively, were chosen empirically to include as many normal ears while excluding as many HI ears as possible.

Table 2

Means, ranges and standard deviations of acoustic reflect thresholds (in DB SPL) for young and old, normal hearing and hearing impaired subjects

Group		500 HZ	1 kHz	2 kHz	4kHz	$\bar{X}$ PT ART	WN	LPN	HPN
YOUNG NORMAL HEARERS	$\bar{X}$	97.4	93.2	93.5	96.4	94.7	81.9	84.9	88.7
	Range	87-107	86.5-101.5	83.5-103.5	81-111	87.3-102.3	64-94	72-92	62-102
	S.D.	7.5	5.4	6.0	8.4	5.2	9.2	6.6	11.1
OLD NORMAL HEARERS	$\bar{X}$	94.5	93.2	93.5	100.6	93.7	84.8	87.0	92.4
	Range	87-107	86.5-101.5	88.5-103.5	86-111	87.3-100.7	74-94	72-92	87-102
	S.D.	7.2	5.4	4.8	9.2	4.2	6.3	6.0	4.0
YOUNG HEARING IMPAIRED	$\bar{X}$	95.3	93.6	100.6	108.9	96.5	92.3	92.0	101.6
	Range	82-102	86.5-101.5	93.5-108.5	96-126	90.6-102.3	84-104	82-97	92-112
	S.D.	5.4	5.0	5.4	11.2	4.0	5.8	6.4	6.2
OLD HEARING IMPAIRED	$\bar{X}$	96.3	93.3	99.2	120.6	96.3	95.1	91.3	103.4
	Range	82-112	86.5-106.5	98.5-118.5	96-131	89-110.7	89-104	82-107	92-117
	S.D.	7.8	7.0	9.4	12.0	7.1	7.4	7.0	7.4

As can be seen in Table 3, using the one plot method, ten "young" and eight "old" normal hearing subjects were correctly predicted to have normal hearing , and two "young" and four "old" normal hearing subjects were predicted to have impaired hearing, yielding a total false positive rate of 25%. 15.4% of the HI subjects were incorrectly predicted to have normal hearing, i.e. four "young" HI subjects, while the remainder, eight "young" and fourteen "old" HI subjects were predicted to be hearing impaired.

Table 3

The number of subjects predicted to have normal or impaired hearing for each of the four experimental groups according to the one plot method

	PREDICTED	
GROUP	NORMAL	HEARING IMPAIRED
YOUNG NORMAL HEARERS	10	2
OLD NORMAL HEARERS	8	4
YOUNG HEARING IMPAIRED	4	8
OLD HEARING IMPAIRED	0	14

Table 4

The number of subjects predicted to have normal or impaired hearing for each of the four experimental groups according to the three plot method

GROUP	NORMAL	HEARING IMPAIRED
YOUNG NORMAL HEARERS	11	1
OLD NORMAL HEARERS	9	3
YOUNG HEARING IMPAIRED	3	9
OLD HEARING IMPAIRED	3	11

In studying Figure 4 one finds an apparent trend with age such that older subjects, especially in the HI group are slightly more displaced to the right. This may have contributed to the slightly higher false positive rate for the "old" normals, 33% versus 16.7% for the "young" normals, and the 0% false negative rate for the "old" HI subjects.

Figures 5, 6 and 7 show the reflex data plotted in accordance with the method suggested by Margolis and Fox (1977) and Handler and Margolis

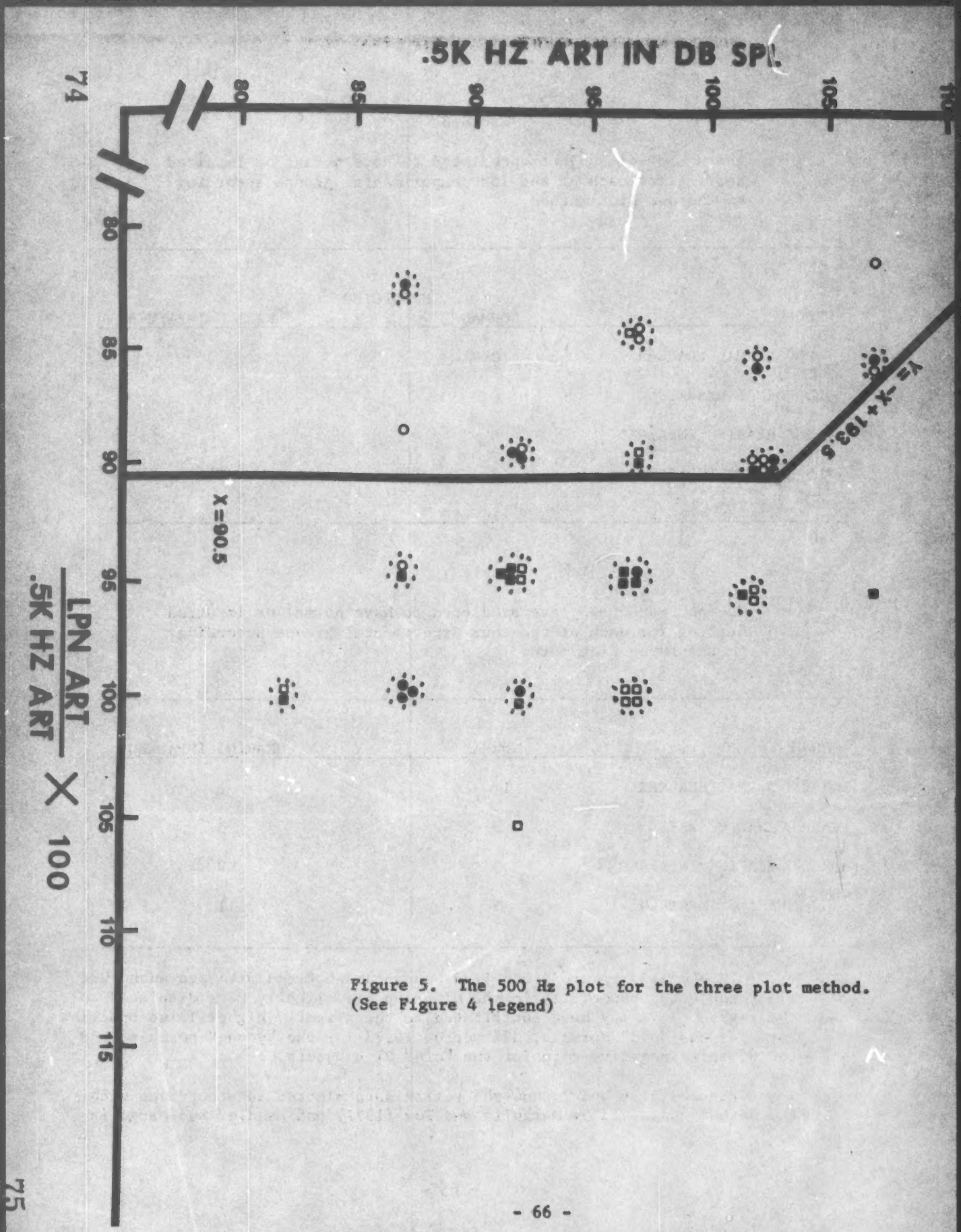

Figure 5. The 500 Hz plot for the three plot method. (See Figure 4 legend)

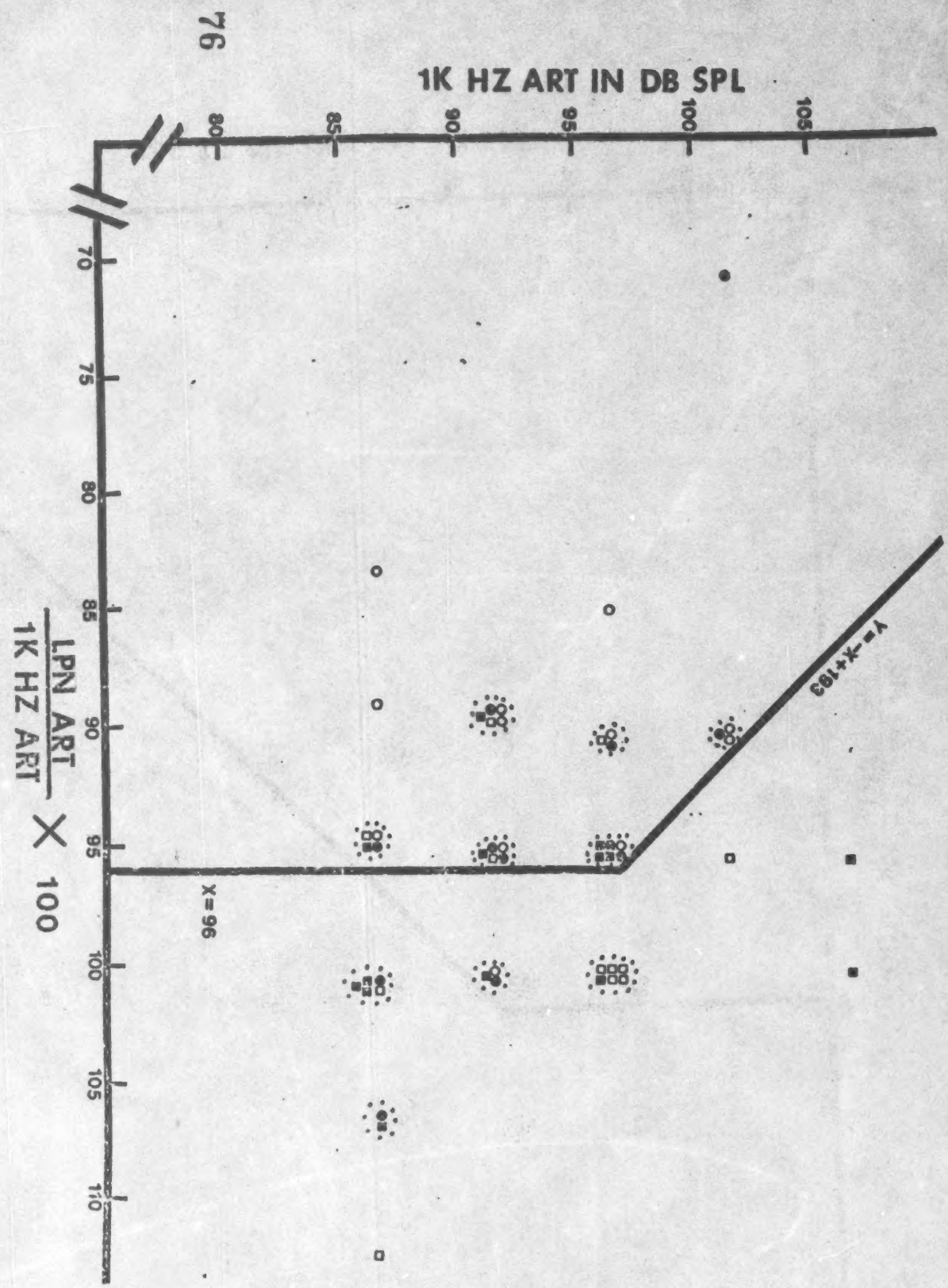

Figure 6. The 1000 Hz plot for the three plot method. (See Figure 4 legend)

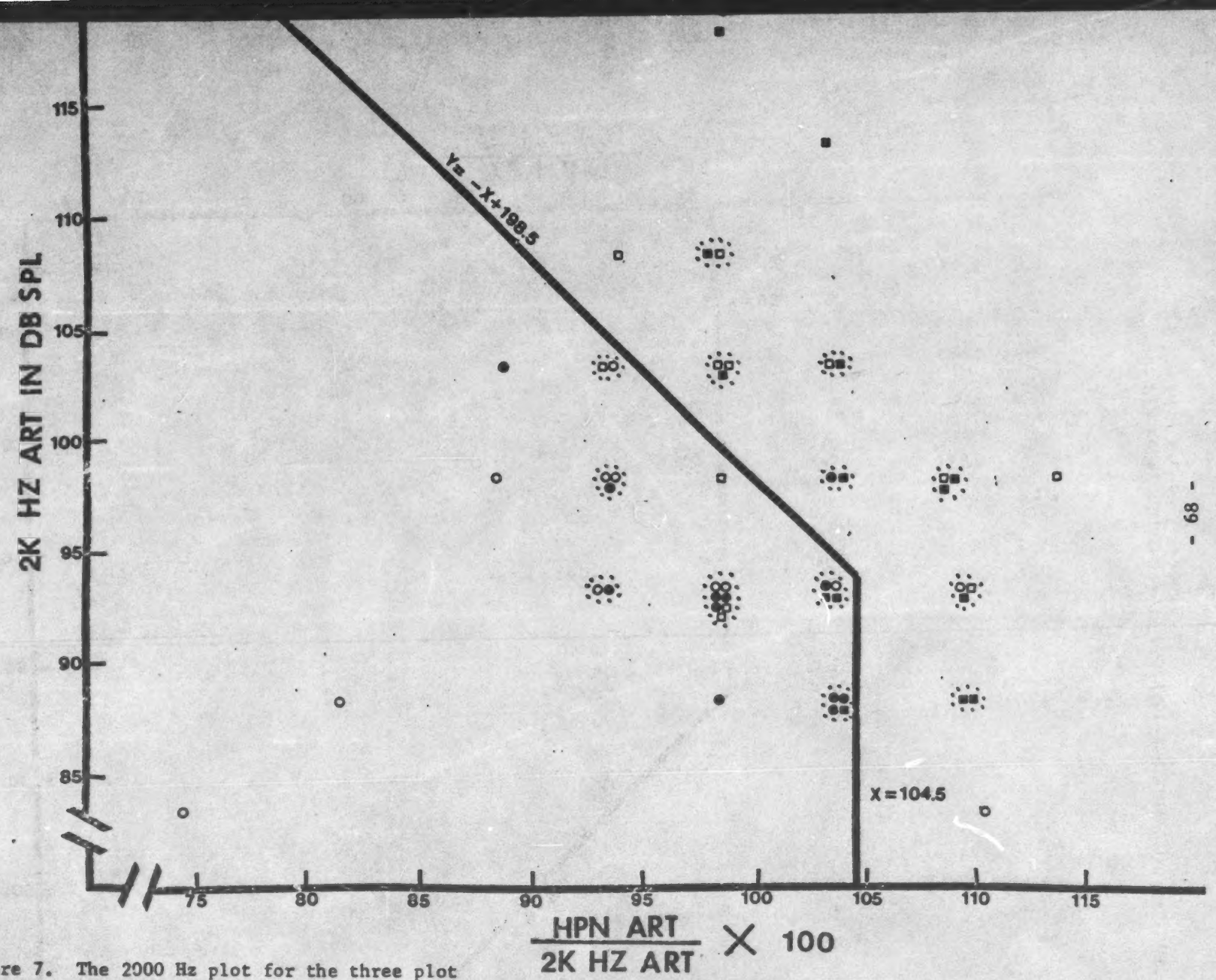

Figure 7. The 2000 Hz plot for the three plot method. See Figure 4 legend.

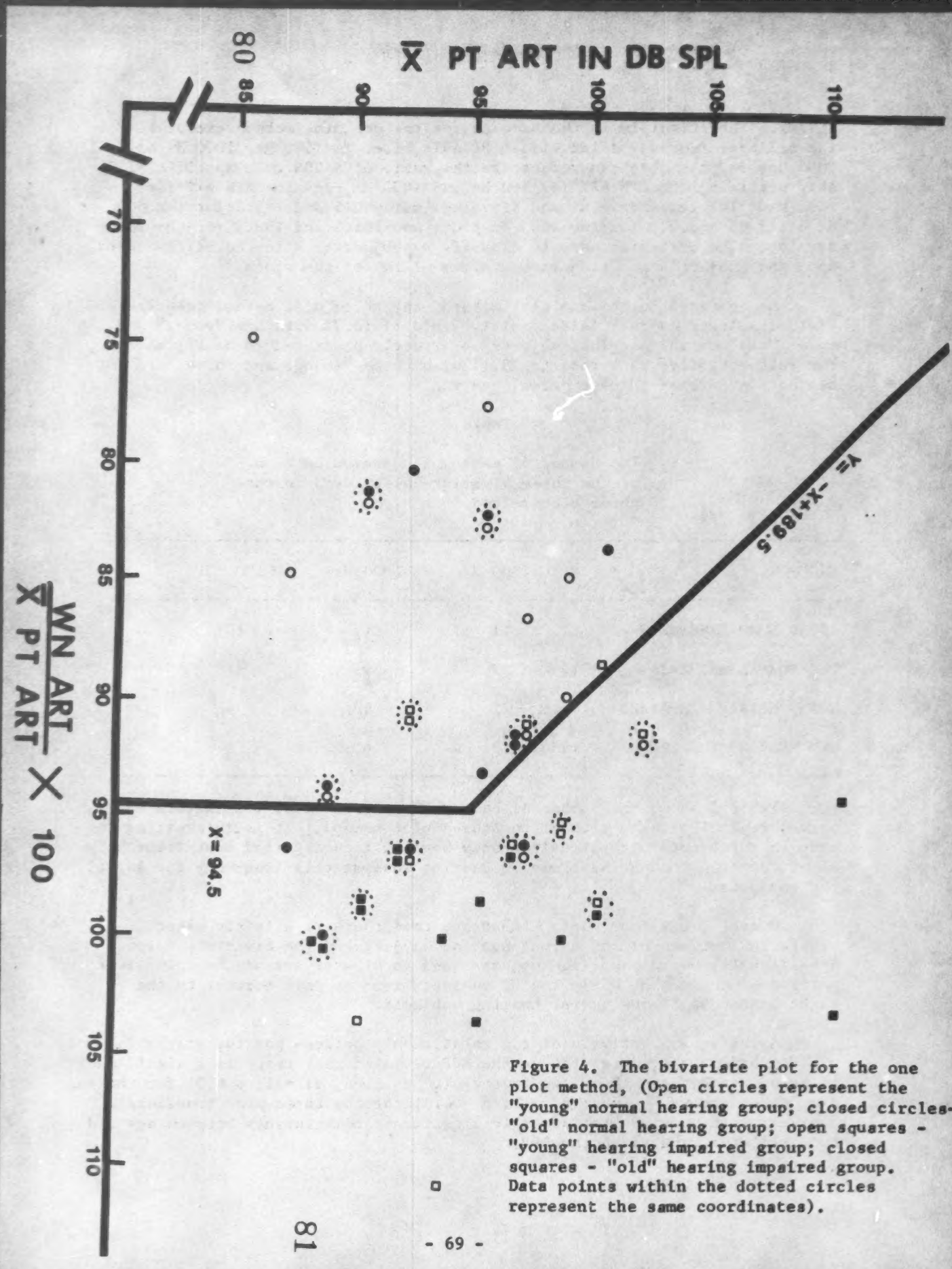

Figure 4. The bivariate plot for the one plot method, (Open circles represent the "young" normal hearing group; closed circles- "old" normal hearing group; open squares - "young" hearing impaired group; closed squares - "old" hearing impaired group. Data points within the dotted circles represent the same coordinates).

(1977). The principle is the same as for the one plot method except that the ordinate represents individual PT ARTs, i.e. for 500 Hz, 1000 Hz or 2000 Hz, and the abscissa represents the ratio of a BBN to a specific PT ART, utilizing the LPN ART for 500 Hz and 1000 Hz, and the HPN ART for 2000 Hz. The respective K1 and K2 values were 90.5 and 193.5 for the 500 Hz plot; 96 and 193 for the 1000 Hz plot; and 104.5 and 198.5 for the 2000 Hz plot. The criterion used to classify a subject as Hl or normal is based upon the subject's position on a minimum of two of the plots.

As compared to the one plot method, the three plot method (see Table 4) yielded a lower overall false positive rate of 16.7% with one "young" and three "old" normal hearing subjects incorrectly predicted to be Hl; however, the false negative rate rose to 23.1% with three "young; and three "old" Hl subjects predicted to have normal hearing.

Table 5

The number of ears which passed on each of the three bivariate plots used in the three plot method

GROUP	N	500 Hz	1000 Hz	2000 Hz
YOUNG NORMAL HEARERS	12	11	11	10
OLD NORMAL HEARERS	12	7	9	11
YOUNG HEARING IMPAIRED	12	2	4	4
OLD HEARING IMPAIRED	14	2	6	3

Table 5 shows the number of ears which passed (i.e. fell within the normal region) on each plot of the three plot method. It is interesting to note that subjects with high-frequency hearing losses failed most frequently at 500 Hz even though there was no hearing loss at this frequency for any of the subjects.

Overall, all four plots illustrate that there is a fairly clear separation between Hl and normal hearing subjects on the bivariate space. Specifically, normal hearing subjects tend to cluster around the lower left portion of the graph, while the Hl subjects tend to fall further to the right and above of the normal hearing subjects.

A chi-square analysis of the relationship between hearing status (normal vs. Hl) and predicted results on the BPP revealed that there is a significant relationship between these two factors (χ^2 = 15.66; df = 1; p <.01 for the one plot procedure. χ^2 - 1582; df = 1; p = <.01 for the three plot procedure). However, there was no statistically significant relationship between age and the predicted results on the BPP.

Discussion

Upon comparing the data obtained in this study with that which is reported in the literature, a number of noteworthy differences were found. First, mean ARTs to all activating signals for both the normal and Hl groups were somewhat elevated as compared to levels previously reported in the literature (Margolis and Fox, 1977; Handler and Margolis, 1977; Silman, Popelka and Gelfand, 1978; Silman, 1979a; Silman and Gelfand, 1979). For example, in a comparison with the data reported by Silman and Gelfand (1979), see Table 1, p. 701) mean PT ARTs were elevated by 2 - 7 dB for all four groups and WN ARTs were 5 - 9 dB higher for the normal hearing groups and 2.5 - 5 dB higher for the Hl group. Moreover, the WN ARTs for the normal group were markedly higher than the thresholds of 70 - 75 dB SPL which have been consistently reported in the literature (Margolis and Fox, 1977; Silman, Popelka and Gelfand, 1978; Silman and Gelfand, 1979). Because of the greater elevation in BBN ARTs than PT ARTs, there was a smaller than expected difference between the two. The difference in normal ears is expected to be on the order of 20 dB (Deutsch, 1972; Silman, 1979a); however, it was only 12.8 dB for the "young" normal hearing ears, and still smaller, 8.9 dB, for the "old" normal hearing ears.

Procedural differences may have been responsible for inconsistencies with previously reported data. Silman (1979a) suggested that Jerger et. al.'s (1978b) failure to duplicate silman's (1979a) findings of a significant increase in WN ARTs with age was related to the fact that Jerger et. al.'s data were collected clinically, whereas Silman used more rigorous laboratory procedures. Similarly, the methodology used in the present study more closely resembled that found in a clinical setting in that reflexes were measured in 5 dB, rather than 1 dB, steps, and were judged by transient changes read on a compliance change meter rather than by deflections on a permanent strip chart recording.

Margolis and Green (1981) suggested that these methods may not be adequate if one wishes to use the BPP with a high degree of accuracy. They related this primarily to the acoustic reflex growth characteristics of BBN versus PT activated reflexes. It is well known (Margolis and Green, 1981) that the acoustic reflex is a graded response, i.e. the magnitude of the measured impedance change increases as a function of intensity. For BBN stimuli, the impedance change at threshold level is very small; it grows very slowly at first as intensity is increased, and then more rapidly at higher intensities. PT ARTs, on the other hand, are characterized by more rapid growth functions, so that it is easier to read a reflex at levels close to the absolute threshold. (This relationship was most evident to the present investigator, who frequently failed to measure a significantly larger deflection at levels 5 dB above the recorded BBN ART, while this reflex growth was generally clear for PT ARTs). In light of these facts, Margolis and Green stressed the importance of using highly sensitive equipment, so as not to lose information on BBN ARTs. They reported that in a study in which different equipment were compared, it was found that BBN ARTs were on the average 9 db lower in the more sensitive equipment,

while PT ARTs differed by only 3 dB. They, therefore, recommended that reflexes be judged from a strip chart recording rather than by visual inspection of the compliance change meter, and that 2 - 2.5 dB steps, rather than 5 dB steps, be used whenever there is some suspicion regarding the sensitivity of the equipment. They further stated that this suspicion should be raised whenever mean WN ARTs are greater than the expected 70 - 75 level, as was the case in this study. It, therefore, seems likely that the elevation in reflexes seen in this study, which was smaller for the PT ARTs as might be expected, may be primarily due to the lack of sensitivity of the equipment which was used.

Although there were differences in the absolute intensity levels of ARTs as compared to those previously reported, relative differences between the normal hearing and HI groups were fairly consistent with the literature. Specifically, a 10 dB increase in the WN ARTs for the HI groups was also reported by Silman and Gelfand (1979), as was the negligible difference in mean PT ARTs for these groups. As noted earlier, the individual frequency data were almost identical at 500 Hz and 1000 Hz for all groups, were slightly elevated at 2000 Hz for the HI groups (which would account for the slight elevation in their mean PT ARTs) and was significantly elevated at 4000 Hz, the region of the greatest hearing loss in most of the HI subjects. This finding lends further support to Silman's (1979a) view that ARTs to tonal stimuli become elevated only after the hearing loss exceeds approximately 50 dB at that frequency. These results suggest that the BPP can be used just as effectively clinically as in an experimental setting.

In studying the WN plot it should be apparent that the major factor responsible for the separation between groups of coordinates is the presence or absence of hearing impairment. This was primarily due to the 10 dB elevation of WN ARTs for the HI groups, which in turn increased the ratios for these groups. In a number of cases, the separation was also aided by the elevation of the mean PT ARTs in the HI subjects to levels which lay above the diagonal.

The influence of a secondary variable, age, should not be overlooked. Although the 3 dB differences in WN ARTs were not statistically significant, they did serve to shift the "old" groups somewhat to the right. It is, therefore, possible to suggest that a higher proportion of young HI subjects came out "normal" on Silman and Popelka's (1979) plot. It is important to note, however, that the findings of this study failed to replicate Silman's (1979a) and Wilson's (in Silman, 1979b) findings of a 9 - 10 dB elevation of WN ARTs in elderly groups of normal hearing subjects, nor did the findings demonstrate a significant decrease in PT ARTs for the "old" group as suggested by Jerger et al. (1973b). Perhaps this can be attributed to the small number of subjects over the age of 60 used in this study, or to the use of clinical, rather than laboratory procedures. However, in a recent study, Thompson et al. (1980) also failed to demonstrate a significant change in ARTs with age in a group of subjects aged 20 - 79 years.

The slight shift in coordinates related to age can not completely account for the distribution of coordinates on the bivariate space, for there is still quite a bit of overlap among the age groups.

Part of this may be explained by the inherent variability in ARTs, especially to PT stimuli, between subjects (Deutsch, 1972; Margolis and Green, 1981). An interesting finding of this study related to subject variability, was that only rarely (three cases) did the two ears of a single subject, which had nearly identical hearing, fall on the same spot on the bivariate plot. Thus, both intrasubject and intersubject variability must be considered.

Previous studies have defined the bivariate space in terms of subjects with flat hearing losses and normal hearing subjects, and only later plotted the subjects with high-frequency hearing losses. This resulted in exceedingly low false positive rates (0% in Silman and Gelfand, 1979; 6% in Margolis and Fox 1977); however, it resulted in poor predictive accuracy for high-frequency hearing losses. The present study, which excluded flat hearing losses, defined the space in terms of normal hearing subjects and subjects with high-frequency hearing loss. This method yielded a false positive rate of 25% (which is lower than that seen in the Niemeyer and Sesterhenn (1974) and Jerger et.al. (1974) methods (Handler and Margolis, 1977), but correctly identified 85% of the high-frequency hearing losses.

Based on these findings, the following modifications are suggested. It is recommended that two sets of intersecting lines be drawn on the plot. The first set (L1) would be standardized on a group of normal hearing and high-frequency hearing loss subjects, as was done in the present study. The second set (L2) would separate normal hearing subjects from subjects with flat hearing losses. This latter set of line segments would be expected to fall to the right of the former since flat hearing loss configurations are characterized by even smaller differences between WN and PT ARTs, and therefore, higher ratios. Under this arrangement, it can be said with a good deal of confidence that subjects falling to the left of L1 are likely to have normal hearing; subjects between L1 and L2 probably have a high-frequency hearing loss, and subjects to the right of L2 have either a mild flat hearing loss (PTA 32 dB HTL) or a high-frequency hearing loss, and almost certainly do not have normal hearing. A fourth area, Silman and Gelfand's (1979) "area 4", defines those subjects with significant hearing loss (average loss of 45 dB HTL for the two poorest speech frequencies or a loss of 60 dB at one speech frequency). Area 4 is located markedly higher on the ordinate, and is consistent with the notion that mean PT ARTs become elevated in the presence of a significant hearing loss. The literature (Margolis and Fox, 1977) has shown that 50% of subjects with "slight" hearing losses (PTA 32 dB HTL) fall within the normal region on the plot. Further research is necessary to evaluate the predictive accuracy of the suggested method with this population.

Another possible source of information can be found in the 4000 Hz ART. Over the past few years, as the various prediction methods have been refined, many researchers have chosen to discard the 4000 Hz ART from the prediction procedures, claiming that it is highly variable (Margolis and Fox, 1977) and is often absent (Hall, 1978). However, the present data suggest that valuable information may be derived from the 4000 Hz ART and, therefore, reflexes should be measured at this frequency routinely. Specifically, an elevated or absent 4000 Hz ART should lead one to suspect a significant loss at this

frequency. This is suggested by Silman's (1979a) findings that ARTs are not elevated until the hearing loss exceeds 50 dB at that frequency. In the present study, a 4000 Hz ART of $\geq$ 106 dB SPL was generally consistent with a loss of at least 45 dB at that frequency. Only six normal hearers had 4000 Hz ARTs of 106-111 dB SPL, and none had ARTs exceeding 111 dB SPL.

The usefulness of this information is primarily to differentiate subjects to the right of L2. In the absence of an elevated 4000 Hz ART, the subject most likely has a mild flat hearing loss, while its presence suggests either a high-frequency hearing loss or a mild sloping hearing loss.

The findings of this study revealed that the results obtained using the one plot and the three plot methods are comparable. Both plotting procedures correctly categorized subjects 80% of the time; however, there was some variation in the false positive and negative rates of the two procedures. Based on this finding, the one plot method might be preferable in that it enjoys a lower false negative rate, and it is generally agreed that it is a more serious error to miss a hearing loss than to incorrectly diagnose a normal hearer as hearing impaired.

A disappointing finding was that the three plot procedure did not provide any useful frequency-specific information. In a hearing loss confined to the high frequencies, one would expect that ARTs to low frequency stimuli would remain essentially unaffected by the loss. Popelka et al. (1976) studied subjects with high-frequency hearing loss and found that although the bandwidth effect was already absent in these subjects at a center frequency of 500 Hz (i.e. reflex thresholds remained approximately the same for all bandwidths), because their reflexes still fell within one standard deviation of normal hearers, there was considerable overlap on the bivariate plot. As the center frequency was increased and approached the impaired region, both the absent bandwidth effect and the overall elevation of the ARTs resulted in a large separation between normal and HI subjects.

In the present study, HI subjects did not pass more often on the 500 Hz plot, but in fact were most clearly separated from the normal hearers on this plot. A possible explanation for the present findings may be related to the frequency spectrum of the LPN. Based on their findings that "ARTs tend to be elevated in proportion to the amount of noise energy in the spectral region corresponding to the frequency region of impaired hearing" (p. 157), Popelka et al. (1976) were able to demonstrate differential placement on the bivariate plot by using relatively narrow noise bands centered around the pure tone stimulus frequency. Thus, at a center frequency of 500 Hz, no energy from the noise band extended into the hearing loss region so that BBN ARTs for the HI group were relatively close to those of the normal hearing subjects. However, as the center frequency was increased so that more energy was present in the hearing loss region, BBN ARTs were elevated for the HI subjects.

The failure to demonstrate this relationship in the present study may be related to the relatively wide bandwidth of the LPN (see Figure 1)

which differed significantly from Popelka et.al.'s (1976). The presence of a large amount of high frequency energy in the noise spectrum may have been responsible for the elevation of the LPN ARTs for the H1 group, when equal LPN ARTs had been expected. If future research, using narrower noise bands centered around the PT stimulus frequency, corroborates Popelka et.al's (1976) findings, it may be possible to extract useful qualitative information from the three plot procedure.

Past research has pointed out that it is difficult to predict the presence of hearing loss in subjects with high-frequency hearing losses with a high degree of accuracy. It had been found that coordinates for high-frequency hearing loss subjects tend to fall about equally on the "normal" and "impaired" regions of the plot. Silman and Gelfand (1979) were the first to suggest that these coordinates do not fall randomly, but rather that subjects with high-frequency hearing losses fall on a portion of the plot which is distinct from subjects with normal hearing and from subjects with a significant hearing loss. The results of the present study lend further support to this view in that a fairly clear separation between normal and high-frequency hearing loss ears was found such that a line could be drawn which correctly predicted normal or impaired hearing with 80% accuracy. Silman and Gelfand (1979) also found that the prediction of hearing loss in high-frequency hearing loss subjects improved as the number of impaired frequencies increased. In the present study, while all hearing impaired subjects had a high-frequency hearing loss, there were some differences regarding the extent of the loss, i.e., the number of impaired frequencies and the severity of the loss in dB at specific frequencies. Future research may want to take a closer look at the effect of these variables on the BPP.

With regard to the effect of age on the BPP, the present study revealed that age does seem to have some influence on a subject's position on the bivariate plot to the extent that older subjects tend to fall slightly further to the right on the plot. However, this influence was not great enough to support the original hypothesis that "young" high-frequency hearing loss subjects would be consistently classified as normal. Perhaps the suggested modifications of the procedure, i.e. the use of two sets of line segments and the incorporation of the 400 Hz ART, will prove useful in confirming the presence of a high-frequency hearing loss in a suspected malingerer. Because this is somewhat speculative, more research is needed to study the relationship between ARTs in subjects with high-frequency and flat hearing losses and normal hearing subjects, to determine the degree of predictive accuracy which the suggested plot offers.

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A Case Study of a Down's Syndrome Child's Discourse Abilities.

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Abstract

The purpose of this study was to examine the discourse abilities of a Down's Syndrome child, and compare his abilities during interactions with different conversational partners; a mentally retarded child matched for M.L.U., a normal child matched for C.A., and a normal child matched for M.L.U. Use of specific discourse categories were examined, as well as the child's ability to hold the dominant position within the subject interactions. Results indicated that the subject was able to use all but one of the defined discourse categories. Differences in the proportional use of specific discourse categories were evidenced across dyads. Findings indicated that the primary subject held the dominant position when paired with the mentally retarded matched M.L.U. and the normal matched M.L.U. When paired with the normal subject matched for C.A., the primary subject did not hold the dominant position.

For many years investigators of child language placed emphasis on the child's linguistic competency in terms of phonology, syntax and semantics. Recently, the focal point of concern has been the study of children as language users in terms of their communicative competence. The communicative competence of a speaker entails more than the knowledge of the semantic and syntactic structure of language (Hymes, 1971; Garvey, 1975; Keenan and Schieffelin, 1976). In fact, it is postulated that the communicative competence and the linguistic competence of a speaker may be based on different groups of skills and may function independently of one another (Blank, Gessner, and Esposito, 1979). If language is to be viewed as a means of communication and social interaction between individuals (Camaioni 1979), then we must look at where communication occurs, in the envronment; examine communicative strategies used in discourse, and see how communicative strategies are altered in conversation.

The area of discourse has been of interest and the topic of many recent research endeavors (Keenan 1974, Keenan and Klien 1975, Keenan and Schieffelin 1976, Bloom, Rocissano, and Hood 1976). Discourse, asdefined by Keenan and Schieffelin (1976) is any sequence of two or more utterances that is produced by a single speaker or by an interaction of two or more speakers. If two interlocutors are to engage in discourse, then one obvious prerequisite to this communicative exchange is that the hearer attends to the speakers utterance. When a speaker wishes to elicit notice from an inattentive listener, additional communicative work must be performed.

Normally developing children use language primarily for social purposes.

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However, the child must first establish communicative functions through nonverbal means in the context of social interactions before he is able to acquire linguistic structures that achieve pragmatic functions. This preverbal communication in child language development is essential for a number of purposes. First, the child must realize that by taking a role in cooperative social exchanges (e.g. gaze interaction) he is able to affect his environment and the people in it. Secondly, prelinguistic communication provides a basis for linguistic communication (McLean and Snyder-McLean, 1978). Eventually, the child demonstrates the ability to engage in discourse. To engage in successful conversational exchanges the child must learn to identify that which is shared knowledge and be able to make judgements about the capabilities and needs of listeners in different social situations. Children must also learn to rely on listener feedback and mutual monitoring for maintaining their part in conversational reciprocity and know when listeners are or are not paying attention (Bloom and Lahey, 1978).

Investigators have determined that children are capable of using strategies aimed at initiating and maintaining conversational exchanges (Ochs, Schieffelin, and Platt 1979; Atkinson, 1979; Keenan and Klien 1975). Ochs, et.al; (1979) examined attention getting strategies used by children as a means of eliciting notice from the hearer. These devices may be nonverbal, such as pointing, touching and showing or verbal, such as vocatives, locating directives and greeting terms. Children as young as 2.9 were observed to engage in extended exchanges that are maintained by focusing on sound sequences or a constituent within an antecedent turn by exact or modified reproduction in the next turn (Keenan, 1974; Keenan and Klien, 1975). Garvey and Hogan (1973) investigated the social speech of dyads of children aged 3.5-5 and concluded that children are capable of engaging in social behaviors and consistently used speech to initiate and maintain contact with one another. Keenan (1974), in a longitudinal study, observed the early morning conversations between twin boys, who at the onset of the study were 2.9. Results indicated that young children are capable of sustaining coherent dialogue over a number of turns. The interlocutors, for the most part, attended to one anothers utterances and provided relevant responses.

The study of discourse is complex since there are numerous variables that need be examined to understand it's composure. Researchers have used a variety of strategies aimed at investigating various aspects of discourse in normal adults and children. Garvey (1975) examined childrens ability to convey and respond to requests for action and observed that children aged 3.6-5.7 exhibited comprehension of the interpersonal meaning factors relevant to direct requests. In responding to requests, children used strategies such as justifying, refusing, and repeating or paraphrasing a request. In observing adult-child and child-child conversations, Mishler (1975) examined dialogue units consisting of successive Question-Response-Confirmation utterances. Each of the three types of discourse studied, Arching, Chaining, and Embedding, were initiated and sustained through questions. It was found that when adults initiate a conversation with a question, they maintain control by successive questioning, called Chaining. When an adult is asked a question by a child, the adult regains control by responding with a

question, called Arching. In child-child conversations, children were found to question each other through a more balanced use of Chaining and Arching. Embedding, in which there are two responses to the initial question, was the least frequently used way of extending a conversation.

The above studies extracted portions of discourse to examine specific features. Although these methods of analysis give us pertinent information as to specific strategies used, they do not account for the discourse in it's entirety. Several investigators have devised and/or utilized systems that have taken a more holistic view of discourse (Keenan and Schieffelin, 1976, Bloom, et.al., 1976; Godlas, 1979). Bloom et.al. (1976) in a longitudinal study of four normal children from 19-36 months, observed the development of a conversational skill, specifically the development of contingent discourse. The authors examined adult-child conversations in terms of the content of utterance and the contextual relationship between messages. Results indicated that in the early stages of discourse development, adjacent utterances, (e.g. those utterances which are immediately preceded by an adult utterance), were more frequent than non-adjacent utterances, (e.g. those which are not immediately preceded by an adult utterance). These children demonstrated an increased ability to initiate conversations as they proceeded from Brown's Stage I through V. Keenan and Schieffelin (1976) introduced a system designed to examine the way topics are initiated, sustained and dropped in naturally occurring discourse.

There are several non-linguistic factors that may influence the speakers behavior within verbal discourse. These include the interlocutors status in terms of sex, age, and their roles relative to one another (Ervin-Tripp 1968). The role and the influencing effect of the listener has been examined in several studies. Gleason (1973) studied the style of verbal interaction between children from infancy to eight years of age observing that there was a marked difference in the style children of the same age employed when conversing with each other as opposed to the style of language directed to adults or to younger children and infants. While both 4 and 8 year olds were able to alter their speech when talking to infants, Gleason found that 8 year olds were better equipped to use the basic features of "baby talk style". These features include use of short repetitive utterances produced in a singing style. Shatz and Gelman (1973) found that 4 year old children altered their languages when speaking to different aged listeners, specifically 2 year olds, other 4 year olds and adults. The four year olds used shorter utterances and more attentional devices with younger children. Mishler (1975) found that differences in authority among speakers can be determined on the basis of linguistic data by examining the functions questions have in controlling a conversational exchange. To reiterate Mishler's findings, it was observed that in adult-child conversations the adult expressed control over the interaction, by use of Chaining and Arching. In child-child conversations, however, a more balanced use of different modes of questioning was observed. This finding was attributed to a pattern of equality or competition for control.

Limited research has been done on the pragmatic abilities of the mentally retarded population, in particular, retardates discourse skills. The majority

of the literature regarding the mentally retarded child's language skills in the area of semantics, syntax, morphology and phonology indicates that in general, they are delayed rather than deviant in relation to normal child language (Lenneberg 1967, Yoder and Miller 1972, Tamari 1978). In light of these findings, a logical hypothosis is that the mentally retarded child's pragmatic skills are delayed at a level commensurate with other linguistic skills. A statement as such, however, would be a gross generalization without sufficient research to document its validity. On the other hand, it is possible that the mentally retarded child's linguistic skills operate independently from his communicative or pragmatic skills. That is, a delay in one area may not necessitate a delay in another (Blank et.al., 1979).

Hebner (1959) states that the lack of adequate interpersonal skills is a defining characteristic of retarded persons. Most studies regarding the communicative skills of retardates examined communicative effectiveness by using structured communication tasks (Spradlin, Giradeau and Corte, 1967; 1969; Longhurst, 1974; 1975; Hoy and McKnight 1977). By utilizing visual barriers in structured communication tasks, it was concluded that the communicative skills of mentally retarded persons are related to their IQ and level of ability. The methods used in these studies and other similar to them required that the retardate comprehend instructions given to him and follow them accordingly. While studies such as these may present us with information concerning retardates abilities to communicate within structured tasks, it would be inappropriate to apply these findings to retardates actual communicative skills. In order to ascertain the retardates communicative abilities it is essential to observe the retardate in naturally occurring discourse (Sabsay, 1975).

Several studies concerning the pragmatics of language of the mentally retarded conclude that the retardate engages in the same pragmatic behaviors as normals (Sabsay, 1975; Bedrosian and Prutting; 1978, Halfond and Tamari, 1980). Halfond and Tamari (1980) found that it was possible to use Dore's (1976) categories of communicative functions with a mentally retarded child and apply it to both verbal and nonverbal communicative intents. Bedrosian and Prutting (1978) examined discourse sustained through questioning according to Mishler's (1975) model and found that mentally retarded adults use the same types of conversational control as do normal adults.. Sabsay (1975) examined naturally occurring and elicited conversations of institutionalized retarded adults and found that the interactions of the retarded adults were in many ways similar to normal adult interactions. Evidence of teasing, information, greetings, arguments, explanations and instructions were observed. The author found that mentally retarded adults were capable of turn taking behaviors and of "repair" responses when communicative distress was signaled.

During interactional contexts, the behavior of mentally retarded persons is significantly influenced by different listeners. Hoy and McKnight (1977) found that both high and low level retarded speakers used different communicative strategies for listeners that were similar and dissimilar to themselves. When the listener was a low level speaker, both high and low level speakers modified their speech style by using more attentional devices, imperatives and repetitions. When addressing a high level speaker, the low level speaker offered less information. Bedrosian and Prutting (1978)

examined interactions between mentally retarded adults and different listeners, including parents, a peer, a speech/language pathologist and a normal six year old, along dimensions of dominance and submission. Results indicated that the mjaority of the mentally retarded adults did not hold the dominant position in any of the four dyads. Sabsay (1975) found that conversational exchanges were more successful in retardate-retardate exchanges than in nonretardate-retardate exchanges. Communicative success was dependent upon the speaker making himself understood and responding appropriately to the other interlocutor.

While Sabsay (1975) examined discourse in retardates, she did not examine the retardates abilities to engage in sustained discourse, nor their abilities to initiate, maintain and terminate discourse topics. In fact, Sabsay states that the retardate may demonstrate an inability to "topic talk". It appears that further study of discourse and the effect of listener is warrented and essential to further examine the development of pragmatic skills in the mentally retarded population.

The purpose of the present study is to investigate the discourse abilities of a Down's Syndrome child, and compare the child's abilities during interactions with different conversational partners; a mentally retarded child matched for M.L.U., a normal child matched for C.A., and a normal child matched for M.L.U. The study was conducted to answer the following questions:

1. Is the mentally retarded child capable of engaging in sustained discourse?
2. Can the communicative behaviors of the mentally retarded subject be broken down and analyzed into specific categories that represent different aspects of discourse, some of which have been applied to normal speakers?
3. What effects do different conversational partners have on the mentally retarded subjects ability to engage in discourse?

Method

Subjects:

Subject A was a 13 year old Down's Syndrome male who received therapy at the Queens College Speech and Hearing Center for 2 years. At the time of the study, A was enrolled in a class for the trainable retarded children in the New York City School System. According to A's mother, developmental milestones were delayed. At the time of the present study, a language sample was obtained and revealed an M.L.U. of 2.79. Administration of the PPVT revealed a receptive M.A. of 5-1, and a raw score below the 1st percentile.

A's expressive language was characterized by a variety of syntactical errors. Word order was often confused and most morphological endings were omitted. A, was able to encode a variety of semantic relations including existence, nonexistence, rejection, denial, recurrence, attribution, possession and quantity. A, was able to talk about objects and events

outside his immediate environment. Therapy was concerned with the training of semantic-syntactic structures such as V+ing+object+locative and the plural morpheme. An audiologic evaluation revealed that A's hearing was within normal limits.

Subject B was a 10 year old Down's Syndrome male who received therapy at the Queens College Speech and Hearing Center for 2 years. B was enrolled in a class for the trainable retarded in the New York City School System. B's developmental milestones were reported to be delayed. A language sample obtained prior to the onset of this study revealed that B had an M.L.U. of 2.6.

B's expressive language was characterized by a variety of syntactical errors. B, was able to encode a variety of semantic relations such as existence, nonexistence, rejection, denial, recurrence, attribution and possession. B was able to talk about events and objects outside his immediate environment. Therapy was concerned with the training of semantic-syntactic structures such as Noun + Locative and Noun + is + Verb + ing. B's hearing was found to be within normal limits. B, served as a retarded M.L.U. match for subject A.

Subject C was a normal 13 year old male. C was enrolled in a seventh grade Junior High School class in the Public School System. C served as a C.A. match for subject A.

Subject D was a 2.10 year old normal male. A language sample obtained prior to the onset of the study revealed that D, had a M.L.U. of 3.0. D's expressive language was characterized by a variety of syntactical errors appropriate to his M.L.U. D, was able to talk about objects and events outside his immediate environment, and was able to encode a variety of semantic relations such as existence, nonexistence, rejection, denial, recurrence, possession, attribution and quantity. D, served as a normal M.L.U. match for subject A.

Apparatus

The experimental procedure was conducted in a 12' X 9' room. An octagonal mat was placed on the floor to create a more informal setting. The room was cleared of all extraneous toys and objects. A toy cabinet remained closed in one corner of the room, preventing the objects within from being in view, but accessable to the subjects if they desired to obtain them. One examiner (E_1) sat at a desk at the opposite end of the room recording contextual cues. Verbal and non-verbal interactions between the subjects was recorded on video (Sony 3400) and on audiotape cassette recorder by a second examiner (E_2).

Procedure

Three informal half hour sessions were conducted, each with different dyads. A, was paired with each of the other three subjects, forming the three dyads. Dyad I consisted of subject A and a retarded matched M.L.U. (subject B), Dyad II consisted of subject A and a normal matched C.A. (subject C), and in Dyad III, subject A was placed with a normal matched M.L.U. (Subject D). During the sessions, the subjects were not given any explicit instructions, nor were they prompted in any way to converse. The

only directions given specified that the examiners would not be involved. The instructions given by E_1 were:

> "S (E_2) and I have work to do, and we'll be very busy. While we are working I want the two of you to talk. Please don't bother us because we have a lot of work to do."

After the instructions were given, E_1 remained seated at the desk for the duration of the session while E_2 worked the video and audio equipment.

All tapes were transcribed independently by the two examiners. An 18 minute segment of each tape was chosen for analysis. Utterances were transcribed with the accompanying suprasegmental features. Nonverbal behaviors of each subject and the non-linguistic contexts were recorded as well. Interobserver agreement was 96% for tape 1, 94% for tape 11, and 99% for tape 111, resulting in 97% reliability for all transcribable utterances. A total of 17% of all utterances were deleted from the analysis due to unintelligibility and/or inaudibility (6% from tape 1, 2% from tape 11 and 9% from tape 111). Only verbal utterances were analysed. Classifications were determined by the linguistic utterance and/or utterance cluster in combination with contextual information.

The analysis of data concerned itself with two areas of investigation:
I. Topicalization II. Effect of Listener on Speaker Dominance

I. Topicalization

Utterances and/or utterance clusters (two or more consecutive utterances within a turn for which only one classification was necessary) were classified as being either Continuous or Discontinuous Discourse Topics (Keenan and Schieffelin, 1976).

A. Continuous Discourse was recorded in terms of the following categories.

1. Incorporating Discourse Topic - A discourse topic that integrates a claim and/or presupposition of an immediately preceding utterance (Keenan and Schieffelin 1976).
2. Collaborating Discourse Topic - A topic that matches exactly that of the immediately preceding utterance (Keenan and Schieffelin 1976).

For the purpose of this study, two subcategories of Topic Collaboration were incorporated.

(a) Acknowledgements - According to Ochs, Schieffelin and Platt (1979), a hearer may indicate his awareness of the speaker and a mutual focus of attention by repetition of part or all of a prior turn. The hearer may also elicit additional information concerning the focus of attention of the previous speaker. The authors state that if the hearer confirms or disconfirms the utterance of the previous speaker, it constitutes an acknowledgement. A Collaborating Discourse

Topic was subcategorized as an acknowledgement for the present study under the following conditions:

(1) When an utterance was an exact or modified repetition of the immediately preceding utterance and served only to acknowledge the prior utterance.

(2) When an utterance was a response or acknowledgement of the preceding utterance (e.g. Response to a question or "Right, I know what you mean").

(b) Topic Extender - A Collaborating Discourse Topic that functioned to facilitate a proceeding continuous discourse topic (e.g. "You play with lego, playdoh and...").

B. Discontinuous Discourse was subdivided into four categories:

1. Introducing Discourse Topic - A discourse topic that is not related to the preceding utterance and does not draw on utterances produced previously (Keenan and Schieffelin 1976).
2. Re-Introducing Discourse Topic - A discourse topic that reintroduces a claim and/or a discourse topic that has appeared prior to the immediately preceding utterance (Keenan and Schieffelin 1976).
3. Attention Getters - Ochs, Schieffelin and Platt (1979) define that specific attention getting strategy as a communicative device that is designed to elicit the attention of a listener. In this strategy, the child uses verbal and/or nonverbal means that are overtly directed toward the addressee. For the purpose of this study, an Attention Getter is defined as an utterance or utterance cluster which served to obtain the listeners attention as a pre-requisite for a Re-Introducing or Introducing Discourse Topic.
4. Off Target Responses - An utterance which has no relevance to the preceding discourse topic and does not function as a Re-Introducing or Introducing Discourse Topic.

Unclassified Utterance - An utterance that cannot be placed into any of the above mentioned categories.

II. Effect of Listener on Speaker Dominance

Folger and Puck (1976) define dominance and submission as types of behaviors exhibited in the style of interaction as reflected through the types of bids (e.g. requests and commands) offered. In Bedrosian and Prutting's study (1978) a speaker was considered dominant in an interaction only if he offered more bids than the other participant, and if the majority of these bids were dominant rather than submissive. For the purpose of the present study, dominance was examined with respect to the topicalization analysis. A speaker was designated dominant in the dyad when the categories of discourse were used with greater frequency in relation to his conversational partner. The rationale for this analysis is as follows:

A. Introducing and Re-Introducing Discourse Topics - The speaker who used these categories with greater frequency exhibited dominance in

the discourse by initiating topics.

B. Attention Getters - The speaker who used this category with greater frequency demonstrated dominance in attempting to elicit the hears attention as a pre-requisite to initiating topics.

C. Topic Extenders - The speaker who used this category with greater frequency demonstrated dominance in his efforts to maintain continuous discourse.

D. Incorporating Discourse Topics - Although the speaker who exhibited a high frequency of Collaborating Discourse Topics demonstrated sophistication in his ability to engage in continuous discourse, the speaker who used Incorporating Discourse Topics with greater frequency demonstrated the ability to expand and elaborate on a preceding discourse topic.

All utterances and/or utterance clusters were coded into one of the defined categories. For the purpose of the present study, proportional frequencies were used for analysis.

Results

Results indicated that the mentally retarded subject (A) demonstrated the ability to engage in coherent, sustained discourse. Table 1 illustrates the proportional frequency of discourse types used by subject for the three dyadic interactions.

Table 1

Proportion of discourse types used by subject A.

Type	Dyad I	Dyad II	Dyad III
Continuous Discourse	.71	.87	.62
Discontinuous Discourse	.28	.12	.37
Unclassified	.01	.01	.01

Across the three dyadic interactions, Continuous Discourse was the predominant discourse type used by subject A. The proportional frequency of Continuous Discourse, however, varied across the three dyads. Subject A used Continuous Discourse with the greatest frequency in Dyad II, while the lowest frequency of Continuous Discourse appeared in Dyad III.

The present study revealed that the communicative behaviors of a mentally retarded subject (A) could be broken down into specific categories that represent different aspects of discourse, some of which have been applied to normal speakers. Table 2 illustrates the proportional use of categories by subject A within each dyad.

Table 2

Proportions of discourse categories used by Subject A.

Categories	Dyad I	Dyad II	Dyad III
Collaborating Discourse Topic	.46	.63	.26
Acknowledgement	(.36)	(.85)	(.74)
Topic Extender	(—)	(.0)	(—)
Incorporating Discourse Topic	.25	.24	.36
Introducing Discourse Topic	.06	.02	.07
Re-Introducing Discourse Topic	.17	.02	.10
Attention Getter	.03	—	.19
Off Target Response	.02	.08	.01
Unclassified	.01	.01	.01

Evidence of all but one category, Topic Extenders, was used by subject A. Topic Extenders were used as a strategy only by one speaker, Subject C of Dyad III.

As stated previously, the majority of utterances and/or utterance clusters were recorded as Continuous Discourse types. In Dyads I and II Collaborating Discourse Topic was the primary category used by Subject A. In Dyad III, the predominant category used was Incorporating Discourse Topic. The proportion of Acknowledgements in relation to the total amount of Collaborating Discourse Topics are illustrated in Table 2. Results indicated that in Dyads II and III the majority of Collaborating Discourse Topics were

Acknowledgements.

In relation to the Discontinuous Discourse types used by subject A, results differed greatly across dyads. In Dyad I, Re-Introducing Discourse Topics were the major Discontinuous Discourse category used. Off Target Responses were the primary type of Discontinuous Discourse used in Dyad II, while Attention Getters appeared to be the most frequent type of Discontinuous Discourse used in Dyad III. Re-Introducing Discourse Topics were more frequent than Introducing Discourse Topics in both Dyads I and III, whereas in Dyad II both were used with equal proportional frequency. Attention Getters were used by Subject A only in Dyads I and III, with a greater frequency in Dyad III. Attention Getters were not used by either subject A or C in Dyad II. Off Target Responses were used by Subject A in all of the three dyads, with the greatest frequency in Dyad II and the lowest frequency in Dyad III.

Table 3 illustrates Subject A's proportional use of discourse categories related to dominance as compared to that of Subjects B, C and D. This table was interpreted in relation to the four criteria determined for speaker dominance.

Results indicated that Subject A used Instroducing Discourse Topics with greater frequency than his conversational partners in both Dyads I and III. In Dyad II, Subject A used a relatively low proportional frequency of Introducing Discourse Topics. It is interesting to note that the proportions vary across dyads with the greatest proportional frequency of use in Dyad III and the lowest in Dyad II. While Subject A used Introducing Discourse Topics with greater frequency in Dyads I and III, there is a noticeable difference in the proportional use of this category across the two dyads. Subject A used Re-Introducing Discourse Topics with greater frequency than his conversational partners in Dyads I and III. There was less variance across dyads with Re-Introducing Discourse topics than with Introducing Discourse Topics. In Dyad II both subjects (A+C) used Re-Introducing Discourse Topics with equal proportional frequency. In relation to criterian A set for speaker dominance, results indicated that subject A was dominant in Dyads I and III, whereas subject C was the dominant speaker in Dyad II. Attention Getters were evidenced only in Dyads I and III. In both these subject interactions, subject A used this category with greater frequency, fulfilling criterion B for speaker dominance. Topic Extenders appeared only in Dyad II. All Occurrences of Topic Extenders were produced by Subject C. With respect to criterion C set for speaker dominance, Subject C was dominant within Dyad II.

Subject A used Incorporating Discourse Topics with greater frequency than his conversational partners in Dyads I and III. There were however, differences across the two dyads. A greater proportional frequency of Incorporating Discourse Topics was found in Dyad III than in Dyad I. Incorporating Discourse Topics were used by Subject A with a relatively low frequency in Dyad II. In relation to criterion D, results indicated that Subject A was dominant in Dyad I and II, whereas the dominant speaker in Dyad II was Subject C.

The results of the effect of listener on speaker dominance indicated

that Subject A emerged as dominant in Dyads I and III, whereas Subject C was the dominant speaker in Dyad II. This pattern was consistent for each of the four criteria set.

Table 3

Subject A's proportional use of discourse categories related to dominance as compared to that of Subject B, C and D.

Categories	Dyad I		Dyad II		Dyad III	
	A	B	A	C	A	D
Introducing Discourse Topic	.68	.32	.24	.76	.93	.07
Re-Introducing Discourse Topic	.85	.15	.50	.50	.74	.26
Introducing and Re-Introducing Discourse Topic	.76	.24	.37	.63	.84	.17
Attention getter	.88	.12	—	—	1.0	.0
Topic Extender	—	—	.0	1.0	—	—
Incorporating Discourse Topic	.61	.39	.36	.64	.85	.15

In sum, results indicated that the mentally retarded subject (A) was able to engage in continuous discourse. Continuous Discourse was found to be the predominant Discourse Type used by Subject A across the three dyads. The proportional frequency of Continuous Discourse differed across the three subject interactions, with the highest being in Dyad II and the lowest in Dyad III.

Subject A demonstrated the ability to use all but one category of discourse behavior, Topic Extenders. The primary Continuous Discourse type used by subject A varied across dyads. The predominant category used in Dyads I and II was Collaborating Discourse Topics, while in Dyad III the most frequent category was Incorporating Discourse Topics. Results indicated that subject A's use of Discontinuous Discourse typed differed across dyads. Those categories having the highest proportional frequency appeared to be Re-Introducing Discourse Topics in Dyad I, Off Target Responses in Dyad II and Attention Getters in Dyad III. According to the

four criteria set for speaker dominance, results indicated that Subject A appeared dominant in Dyads I and III, whereas Subject C emerged as the dominant speaker in Dyad II.

In relation to criterion A, Subject A was found to be dominant in Dyads I and III in light of the greater proportional frequency of Introducing and Re-Introducing Discourse Topics, while Subject C used these categories with greater frequency in Dyad II. In that Attention Getters appeared only in Dyads I and III, dominance in relation to criterion B was determined for these dyads only. Results indicated that Subject A used Attention Getters with greater proportional frequency than either Subject B or D. This finding indicated that Subject A was the dominant speaker in both Dyads I and III according to criterion B.

In that Topic Extenders appeared only in Dyad II, speaker dominance was determined only for subject interactions between A and C for criterion C. Findings indicated that all occurrences of Topic Extenders were produced by Subject C. Hence, Subject C emerged as the dominant speaker according to criterion C. Results indicated that Subject A more frequently used Incorporating Discourse Topics than did Subjects B or D in Dyads I and III. Subject C had a greater proportional frequency of Incorporating Discourse Topics than did Subject A in Dyad II. According to criterion D, Subject A was found to be dominant in Dyads I and III, while Subject C was clearly the dominant speaker in Dyad II.

To reiterate, results of the effect of listener on speaker dominance indicated that in relation to the four criteria, Subject A was dominant in Dyads I and III, whereas Subject C emerged as the dominant speaker in Dyad II.

Discussion

The findings of the present study indicated that the mentally retarded subject (A) was capable of engaging in coherent continuous discourse by using the same strategies displayed by normal speakers. Listener-speaker interaction appeared to play a significant role in the proportional use of discourse categories by the retarded subject. In addition, results indicated that the role of the listener was an influencing factor in the expression of dominance.

In examining a child's communicative skills it is essential that we look at language as a means of communication and social interaction between interlocutors (Camaioni, 1979). It is of particular importance that the pragmatic skills of disordered children be studied in relation to the appropriateness of language in discourse (Halfond and Tamari, 1980).

The role of the listener may alter the discourse behaviors of a speaker. Features such as sex, age, size, environment, M.A. and linguistic level have an influencing effect on speaker/listener pairs within a dyadic interaction. Several studies (Lackner, 1968, Morehead and Ingram, 1973) have emphasized the appropriateness of matching normal and language impaired subjects on the basis of linguistic level. However, when subjects are matched for M.L.U., nonlinguistic factors such as age, size and M.A. may effect performance.

When a mentally retarded child is paired with a normal child matched for M.L.U., the normal child will in most cases by younger. This dissimilarity in C.A. may result in differences in environmental experience, interests and vocabulary. In the present study, while the normal subject (D) and the mentally retarded subject (B) were matched for M.L.U., differences in size and age existed. Subject C who did share the same age and size as Subject A differed from him with respect to linguistic level and M.A. In addition, there were differences with respect to familiarity of the setting in which the data was collected. The setting in which the procedure was implemented was familiar to Subject A but unfamiliar to the remaining subjects.

Results of the present study indicated that the mentally retarded subject (A) was able to engage in continuous discourse as evidenced by the strategies used for the maintenance of topics. Continuous Discourse was the predominant discourse type used, however, the proportional use varied across dyads. The proportional use of Continuous Discourse types is directly related to Subject A's use of Discontinuous Discourse types. It appears that with the exception of Off Target Responses, which are inappropriate, increased ability is necessary for Discontinuous Discourse types. The authors suggest this because Discontinuous Discourse types require that the subject have the intention to initiate topics. It should be noted that the ability to use Discontinuous Discourse types varies with respect to the subjects conversational partner.

Findings indicated that the mentally retarded subject (A) was able to use all discourse categories with the exception of Topic Extenders. The use of Topic Extenders was evidenced only by the normal C.A. match, which suggests that Topic Extenders may be a more sophisticated discourse strategy possibly acquired at a later developmental stage than the other discourse categories. Topic Extenders appear to be a more advanced strategy in that they function as a form of prompting commonly used in the teaching process.

Differences emerged with respect to the predominant Continuous Discourse category used by Subject A within each dyad. In Dyads I and II, Collaborating Discourse Topic was the primary category used by Subject A, while in Dyad III the predominant category was Incorporating Discourse Topic. Since Incorporating Discourse Topics require that new information be added to the immediately preceding utterance, while Collaborating Discourse Topics did not, it would be reasonable to suggest that Incorporating Discourse Topics are the more complex of the two, and hence, require increased skill. It is the authors contention, that in Dyad I Collaborating Discourse Topics were the most dominant due to Subject A's frequent use of repetitions as a means of responding to Subject B's preceding utterance. In Dyad II, the great proportional use of Collaboration Discourse Topics was due to Subject A's responses and Subject C's excessive questioning. In Dyad III, the abundance of Incorporating Discourse Topics may have been the result of Subject A's attempts to continue the discourse topic at hand by incorporating new information.

Differences also arose with reference to the Discontinuous Discourse types used by Subject A across the dyads. Re-Introducing Discourse Topic was the primary Discontinuous Discourse category used in Dyad I, Off Target Response was the major category of Discontinuous Discourse used in Dyad II, while in

Dyad III, Attention Getter was the most frequent type of Discontinuous Discourse category used. Re-Introducing Discourse Topics were most prevalent in Dyad I due to the limited number of topics that were introduced during the dyadic interaction, and the great frequency with which these restricted number of topics were introduced throughout the entire stretch of discourse. A post hoc analysis revealed that in Dyad I, the two mentally retarded subjects limited their talk to three recurrent topics. In Dyad II, the high proportional use of Off Target Responses by Subject A was a result of Subject A's inability to comprehend and respond appropriately to Subject C's utterances. Although the present study did not attempt to investigate Subject C's level of language used when communicating to Subject A, it is the authors contention that Subject C used syntactically and semantically complete constructions that were probably not comprehended by Subject A. The great proportional use of Off Target Responses in Dyad II is proposed to be a result of a breakdown in communication due to reduced comprehension. In Dyad III, where Subject A was paired with a normal child matched for M.L.U., Attention Getters were the primary category used. Shatz and Gelman (1973) found that four year old children used more explicit requests for attention when addressing younger children. Subject A's frequent use of Attention Getters indicated that Subject A viewed and consequently treated Subject D as a younger child although linguistically the two subjects were at comparable levels.

In relation to the effect of listener on speaker dominance, results remained consistent with reference to the four criteria. Subject A was dominant in Dyads I and III, whereas Subject C emerged as the dominant speaker in Dyad II. While Subject A was dominant in both Dyads I and III, a degree of difference existed in the level of dominance expressed. According to criterion I, 2 and 4, Subject A exhibited a higher degree of dominance in Dyad III than he did in Dyad I. Subject A produced .76 of all Introducing and Re-Introducing Discourse Topics in Dyad I as opposed to .84 in Dyad III, .88 of all Attention Getters in Dyad I in contrast to 1.0 in Dyad III, and .61 of all Incorporating Discourse Topics in Dyad I in comparison to .85 in Dyad III. These findings indicated that while in both Dyads I and III Subject A held the dominant position, in Dyad I a more egalitarian relationship existed. While both Subjects B and D were matched for M.L.U., Subject B shared nonlinguistic features that were more closely related to Subject A., which may have resulted in somewhat of a peer relationship. Several factors contributed to Subject A's dominance in Dyad I. These include age and size differences, and familiarity with the experimental environment. While Bedrosian and Prutting (1978) found that the majority of their mentally retarded adult subjects did not hold the dominant position in any of the four dyads (With peers, parents, speech/language pathologist and a younger child), one subject was dominant when interacting with his peers and the younger child. Similarly, the present study found Subject A dominant with the younger child and that subject that could best be classified as a peer match.

Prior to the interest in the pragmatics of language, language acquisition was examined with respect to phonological, semantic and syntactic development. Consequently, therapy for the language disordered child concentrated on developing competence in the above mentioned areas. With the emphasis on pragmatics, language therapy is concerned with the development of pragmatic skills as well as other linguistic skills. The present study demonstrated that a mentally retarded child is capable of engaging in coherent sustained

discourse with varying ability among different listeners. Therapeutic intervention for the retarded should examine both the child's linguistic and communicative competence. Therapy should entail training of semantic and syntactic structures in a broader framework, that of discourse. It is apparent that the retardates' discourse abilities differ in relation to varied conversational partners. It is imperative that training of discourse abilities be implemented in several contexts and with varied conversational partners. In addition to the speech/language pathologist, parents, peers and siblings should be maximally involved in the intervention procedure.

Further research is warranted to fully understand the development of pragmatics in the mentally retarded, in specific the development of discourse. While most research indicates that the mentally retarded child is delayed in his acquisition of semantics, syntax and phonology, evidence is needed to generalize this conclusion to pragmatic development.

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Focusing on mother-child interaction in therapy with a language impaired child

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Abstract

This study was designed to observe the language learning environment of a severely emotionally disturbed language impaired child. Two specific areas were addressed. First, we described the communicative environment of a language impaired child by focusing on mother-child interaction within naturalistic contexts. Second, we manipulated the language learning environment to provide more meaningful exchanges between mother and child. Videotaped recordings of clinician-child interaction were used to demonstrate effective and ineffective interaction styles. The mother's input was analyzed as to its syntactic, semantic and pragmatic features. Results revealed that the mother had a directive style with her child. Several changes were noted after training. First, there was a decrease in the mother's M.L.U. Second, there was a closer correspondence between the semantic relations encoded by the mother and child. Third, the mother was better able to follow the child's lead; and fourth the mother was more responsive to the child's verbal and non-verbal actions.

Researchers have found that language input to the normal language learning child is radically different from language directed to adults or adolescents (Nelson, 1978; Snow 1972). Speech directed to young children learning language has been found to be redundant, syntactically less complex, drecreased in mean length of utterance and less varied (Phillips, 1973; Snow, 1972). Reportedly, adult input to the young child contains a restricted vocabulary with a limited range of semantic categories (Snow, 1977). In terms of phonological differences, maternal input to children has been characterized as being clearly enunciated with distinct pauses between utterances (Newport, Gleitman and Gleitman, 1977). More recently, research has focused on the pragmatic aspects of adult input. It has been reported that speech to normal children contains more imperatives, directives and questions (Lieven, 1978; Ringler, 1978).

The effect of "motherese" on the child's acquisition of language has been the subject of much recent investigation, although the complex relationships between mother's input and child's acquisition is far from understood. Nelson (1973) reported that the nature of the mother-child interaction had significant effects on the child's subsequent linguistic development. Specifically, she found that young children who exhibited faster rates of linguistic acquisition had mothers who accepted the child's output. Their style tended to match the child's cognitive organization. In contrast, those mothers whose cognitive organization did not match their child's cognitive level and who often rejected their child's linguistic output as being inaccurate, had children whose language development was

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more delayed. In other words, Nelson found that when the communicative styles of the mother and child were operating in synchrony, the child's acquisition of language was facilitated.

Cross (1978) investigated syntactic, semantic and pragmatic aspects of mother's input to normal children. She found the greatest number of differences in the area of discourse between mothers of accelerated versus slower language learners. The degree to which the mother's utterances were contingent upon (or semantically related) to the child's preceding utterance positively affected the child's rate of language acquisition. The children who acquired language at a faster rate had mothers whose utterances consistently matched the child's semantic level and incorporated the child's semantic intentions. In other words, these mothers responded to the child's self-initiated utterances and they produced few utterances which changed the topic of discourse. Cross described 'good language teachers' as those mothers who allowed their children to initiate conversations and in addition, they maintained the interactions by expanding their child's topics. Snow (1979) modified Cross' analyses and looked at maternal utterances in relation to the child's verbalizations, non-verbal activities or vocalizations. She found that the majority of mother's input was semantically-related to the child's ongoing verbalization or non-verbal activity.

Most of the literature in the area of adult-child interaction has focused on only one participant in the interaction; that is, on either the parent or the child (Nelson, 1978). In order to better understand the effects of parental input on the language learning child, the bidirectional relationships in these exchanges must be investigated. In other words, researchers must start to look at"the synchronization of the communication system of the adult and the communication system of the child." (Mahoney, 1975).

Lieven (1978) looked at bidirectional interactions between two mother-child pairs. In comparing the speech of those two mothers to their children, she found significant differences between the mothers' styles of interaction. One mother was highly responsive to her child's language and her child spoke coherently about things in the environment. In contrast, the other mother was less responsive and less accepting of the child's output and this child used language mainly to attain the mother's attention and engage the mother's interest. Lieven proposed that a "child by virue of the way she/he talks may be influencing the way in which other people speak to her/him." (p.185).

In terms of research related to language impaired children, a limited amount of research is available which looks at maternal input to language impaired children. Cramblitt and Siegal (1977) found that adults use different speech styles when talking to a language impaired child in contrast to a normal child. They reported that adult speech to one language-impaired child contained many simplifications. Specifically, adult speech was more fluent with a lower type-token ratio and a smaller mean length of response. Further, more imperatives

(than declaratives) were used in the conversations with the language impaired child. Stein (1976) compared parent's language to normal and language impaired children and found similar results. She reported that parents of language impaired children produced shorter and less complex utterances to meet the needs of their language impaired children.

Rondal (1977) studied maternal input to normal and Down's syndrome children matched on linguistic level. She looked at the semantic, syntactic and pragmatic aspects of the mother's input. Results indicated that for both groups of children, mothers modified their input according to the child's linguistic level in terms of quantitative output, lexical, syntactic, semantic and language-teaching aspects. The differences reported in other studies of adult input to language impaired children were not substantiated in this study. In other words, when normal and mentally retarded children were matched on linguistic level, the linguistic input they received was the same. This may be an important piece of evidence indicating that parents do not react to the child's chronological age but rather to his level of linguistic functioning.

In terms of the communicative functions of adult input to disordered children, researchers have generally noted that adults are more directive in their interactions. Adult input to language impaired children has been characterized as containing more demands, commands and requests. Further, it has been reported that much of the parent's input to their disordered child serves to get or maintain the child's attention (Stein, 1976; Giattino, Pollack and Silliman, 1978; Grossfeld and Geller, 1980).

Wulbert, Inglis, Kriegsman and Mills (1975) investigated parent-child interactions with 20 language delayed children (between the ages of 2.5 and 6 years) and compared these mother-child interactions to a group of 20 normal children and 20 Down's syndrome children. They found that maternal input to the language impaired children was significantly different from maternal input to the normal and retarded children. They reported the greatest differences in areas related to mother-child interactions. First, in terms of emotional responsiveness, mothers of language impaired children talked about their children critically and seldom praised their children. Second, in terms of punishment, mothers of language impaired children seemed quicker to threaten to spank their children, whereas mothers of normal children more often reasoned with their children. Third, in terms of maternal involvement, mothers of language impaired children usually met their child's daily living needs, however, they did not spend as much time playing with the child or encouraging them to learn as the other mothers did.

Similar to the literature on mother-child interaction in normally developing children, most of the research with language impaired children has focused on only one participant of this dyad, either the mother or the child. Recent research by Blank, Gessner and Esposito (1979) looked

at the bidirectional relationship between one language impaired child and his parents. Blank et al. focused on speaker-initiator and speaker-responder roles for all participants. Their results indicated that although the parent's responses were almost always adequate, the language deficiant child provided inadequate responses when the parents were speaker-initiators. (They defined inadequate as an utterance that is "either invalid, irrelevant or insufficient to meet the constraints established by the speaker-initiator's utterance"). The child was capable of initiating almost any type of exchange but consistently ignored language directed toward him which required a response.

Mahoney (1975) has discussed the importance of looking at the bidirectional relationships between parents and children in language intervention programs. He believes that the child's language evolves from social interaction in his environment, in which the child's non-verbal system is an important part of the interaction. Mahoney suggests that initially language intervention procedures should develop the non-verbal communicative systems between the child and his parents. In other words, the child must be able to detect on a non-verbal level the meaning of his parent's utterances. Further, the parents must use the non-verbal feedback from the child to determine if their language is being comprehended. Finally, parents must be able to determine the child's intentions from his non-linguistic cues.

There have been several attempts to involve parents of language impaired children in therapy programs. The goals of most parent training programs have been to teach mothers of language impaired children to interact with their children in more effective ways in order to increase the verbal communication skills of the child. Seitz and Riedell (1974) and Seitz and Hoekenga (1974) used procedures in which the parents of mentally retarded children observed videotapes of themselves interacting with their child. These parents observed their child interacting with several clinicians while one clinician discussed the interactions with the mother. It should be noted that most parent training programs have focused on the parents of mentally retarded children. Few, if any have dealt with parents of emotionally disturbed children.

The purpose of this study was to observe the language learning environment of a language impaired child. Several specific areas were investigated. First, we wanted to describe the communicative environment of a language impaired child by focusing on mother-child interactions within naturalistic contexts. Second, we wanted to manipulate the language learning environment of this language impaired child to provide more meaningful communicative exchanges between the mother and child. Specifically, clinician-child videotapes were used to model effective interaction strategies between the adult and child. These communicative teaching strategies were modeled and discussed with the mother who subsequently engaged in play with the child and tried to use these new interaction strategies.

Method

Subject:

G., a 5.6 year old language-impaired child had been enrolled at the Queens College Speech and Hearing Center for one year. He exhibited severe expressive and receptive language deficits, characterized by a limited corpus of single word utterances. His lexicon consisted of the following forms: "gimme", "open", "mommy", "baby" and "juice". Generally, G. was a minimally verbal child with infrequent use of single word utterances. Severe behavioral problems were evident which involved withdrawal from interpersonal communicative interactions, lack of person gaze and self-destructive behaviors. His play patterns were often inappropriate.

G.'s developmental history revealed a delay in gross and fine motor skills. Results of a neurological evaluation suggested that G. exhibited "probable static encephalopathy of prenatal origin but a specific etiologic factor could not be delineated." G. attended a special school for exceptional children.

The goals of G.'s therapy program were to stimulate communicative interactions on verbal and non-verbal levels; to improve non-verbal communicative abilities and to encourage G. to encode certain early occuring semantic relations within request, regulatory and interactional functions. Further, attempts were made to involve G.'s mother in all aspects of training.

Informal observations of this mother-child dyad were characterized by the mother's unresponsiveness toward the child (e.g. lack of physical interaction), frustration and inability to cope with any of the child's behaviors.

Apparatus:

Experimental sessions were conducted in a 5' by 8' section of a therapy room at the Queens College Speech and Hearing Center. A pool of toys and several food items were selected for the three contexts: Free Play (Context I): Teaching Task (Context II) and Snack (Context III). The toys for the free play situation included blocks, a record player (and records), musical instruments, cars, a rocker, dolls, water toys, a sink (filled with water), ball and popper and a toy tractor. For the teaching task, stack toys, a cash register, Mr. Potato Head and a shape box were used. The food items for the snack context included yogurt, ice-cream, juice, bread, crackers and fruit.

All sessions were videotaped with a Sony 3400 and ½" reel to reel tape and later transcribed by one experimenter.

Procedure:

Pre-training measurements of mother-child interactions were made within naturalistic settings. Videotapes of three different contexts were made. Contexts were presented in random order within one session. Contexts included: Free Play (Context I), Teaching Task (Context II) and Snack (Context III). Each context was presented twice over two days with a total of approximately 30 minutes of mother-child interaction. Each context lasted between 8-10 minutes, depending upon the child's attention and behavior. During Free Play (Context I), the mother and child had the option of sitting at a table or on the floor and a variety of toys were in the room. The mother was instructed to play with G. as she would at home. During Teaching Task (Context II), the mother and child were seated at a table which displayed a variety of toys which required object manipulation. Toys selected for the Teaching Task were equally difficult and unfamiliar to G. The mother was told to "teach G." how to put together one of these unfamiliar toys. During Snack (Context III) the mother and child were seated at a table with an assortment of food out on the table. The mother was instructed to have snack with G. as she would at home.

Based on the observations of mother-child interaction in the three contexts, we instituted an experimental procedure and attempted to modify specific aspects of the mother's communicative style with this child which we felt were ineffective. Areas to be modified included:

1. Semantic Relatedness of mother's input. In this area, we encouraged the mother to talk about the "here and now" and to produce utterances contingent upon G.'s non-verbal and verbal activities.

2. Teaching Strategies - In this area, we encouraged the mother to use a variety of teaching strategies to increase the child's verbal output (e.g. use of imitations and interpretations).

3. Responsiveness - In this area, we encouraged the mother to respond to all of the child's self-initiated verbal and/or non-verbal communicative interactions.

Videotaped recordings were made of clinician-child interactions to demonstrate more effective and less effective methods of interacting with G. Videotapes were made for each context: Free Play (Context I), Teaching Task (Context II) and Snack (Context III). Each modeling tape was 10 minutes in length, totaling 30 minutes of clinician-child interactions.

During the training procedure, the mother was given a data-sheet which highlighted specific non-verbal and verbal aspects of adult-child interactions which reflected both effective and ineffective interaction styles. We focused on the Content of Adult Input, Varied Teaching Strategies and Adult Responsiveness (See Appendix A). It should be noted that we highlighted only certain areas on this sheet which would result in more effective interaction styles with this youngster. Areas

highlighted are asterisked. The mother, clinician and graduate student viewed 4-5 minute segments of one clinician-child videotape (Free Play, Teaching Task or Snack). Following the viewing, the various effective and less effective methods of interaction were discussed.

After viewing a segment, mother-child interactions were taped on a subsequent day; then the mother, clinician and graduate student viewed the tape and again discussed both positive and negative mother-child interactions in relation to the verbal and non-verbal aspects listed on the data sheet (Appendix A).

Each context in the training procedure was presented twice. In other words, the mother viewed each clinician-child segment twice (for each context) and did each segment twice. The cumulative total of mother-child interactions during the training stage was 30 minutes, which was 10 minutes for each context (Free Play, Teaching Task and Snack).

Upon completion of the training program, post-training measurements of mother-child interactions within the same naturalistic settings (as described in the pre-training measurement) were videotaped. The three contexts: Free Play (Context I), Teaching Task (Context II) and Snack (Context III) were presented in random order within one session. Each context was presented twice over two days totaling approximately 30 minutes of mother-child interactions. Each context lasted 8-10 minutes depending upon the child's attention and behavior.

Results

The mother produced 575 utterances in the pre-training measurement and 567 utterances in the post-training measurement when the three contexts were combined. It should be noted that all contexts were combined in our results since significant differences were not found between contexts. During pre-training the mother's M.L.U. was 3.0 morphemes, and during post-training it decreased to 2.5 morphemes. The mother's utterances were analyzed according to grammatical sentence types. Table I illustrates the sentence types used by the mother during pre and post-training. No marked differences were found from pre to post-training regarding changes in sentence types. The majority of the mother's were imperatives and declaratives. It is interesting to note the infrequent use of questions, imitations and/or expansions of the child's utterances.

Table 2 illustrates the adult's communicative functions used during pre- and post-training.

The greatest proportion of utterances used by the mother fell into the Teaching and Interactional functions. During pre-training .46 of the mother's utterances encoded the Teaching function and during post-training .45 of the mother's utterances encoded this same function. Within the Teaching function, two different types of teaching strategies were analyzed - language teaching versus teaching the child how to manipulate objects. In

terms of language teaching there was an increase in the mother's use of naming and commenting, which involved talking about the child's and/or adult's ongoing activity from pre-training (.14 of the utterances) to post-training (.25 of the utterances). In terms of utterances related to teaching the child how to manipulate objects, there was a decrease from pre-training (.24 of the utterances) to post-training (.10 of the utterances).

Table 1

Sentence types used by the mother during pre and post training.

Type	Pre-training		Post-training	
	N	proportion	N	proportion
Imperatives	278	.48	268	.47
Declaratives	235	.41	254	.45
Questions:				
Yes/No questions	21	.04	21	.04
WH questions	19	.03	14	.02
Imitations of child's utterances	5	.01	4	.01
Expansions of child's utterances	0	.00	5	.01
Uninterpretable	17	.03	1	.001
Total	575		567	

In terms of the Interactional function, during pre-training, .34 of the mother's utterances coded this function and during post-training .27 of her utterances coded this same function. However, different sub-categories were emphasized within this 'global' function. Specifically, there was an increase in the mother's ability to engage or maintain play with the child from pre-training (.09 of the mother's utterances) to post-training (.22 of the mother's utterances). Further, there was a marked decrease in the number of utterances used by the mother to get or direct the child's attention (from .21 to .03 of the mother's utterances).

Within the category of Responsiveness, no significant differences were noted. In other words, there were no marked changes in the mother's

Table 2

Adult Communicative functions
used during pre and post training

Type	Pre-training		Post-training	
	N	Proportion	N	Proportion
I. Requests				
A. give directions regarding activities of daily living	47	.08	69	.12
B. to elicit information	13	.02	20	.03
C. to suggest an activity	08	.01	00	.00
D. indirect request	01	.001	03	.01
sub-total	69	.11	91	.16
II. Interactional				
A. engage or maintain play	50	.09	131	.22
B. get/direct child's attention	123	.21	20	.03
C. conversational fillers	24	.04	12	.02
D. clarification	00	.00	00	.00
sub-total	197	.34	163	.27
II. Teaching				
A. imitation	21	.04	25	.04
B. expansions	00	.00	03	.001
C. corrections	19	.03	21	.04
D. interpretations	04	.01	11	.02
E. naming	55	.09	80	.13
F. teach child to manipulate toy	138	.24	57	.10
G. comment	28	.05	69	.12
sub-total	265	.46	264	.45
IV. Responsiveness				
A. adult acknowledges child's non-verbal activity	26	.04	35	.06
B. adult acknowledges child's verbal behavior	06	.01	03	.01
C. adult acknowledges child's verbal and adds information	03	.01	09	.02
D. adult acknowledges child's verbal and ignores topic	09	.02	05	.01
E. adult doesn't respond to child's verbal behavior	07	.02	01	.001
F. adult doesn't respond to child's inappropriate behavior	03	.01	15	.02
sub-total	54	.11	68	.12
V. Uninterpretable	02	.003	08	.01
Number of utterances double coded	12		28	
Total	599		622	

verbal acknowledgements of the child's verbal or non-verbal behavior after training. It should be noted that our Request category pertained to the mother's directions to the child regarding activities of daily living or discipline. Directions related to the task were not coded within the Request function. (See Appendix B for further explanations of the adult's communicative functions).

Table 3 illustrates the mother's input during pre- and post-training sessions.

Table 3

Mother's Semantically Related Speech during pre and post training

Utterance type	Pre-training		Post-training	
	N	proportion	N	proportion
Maternal utterances Semantically related to child's activity:				
adult-initiated topic	310	.54	91	.16
child-initiated topic	98	.17	428	.75
Maternal utterances Semantically related to child's utterance	18	.03	27	.05
Maternal utterance not semantically related to child's non-verbal activities, vocalizations or utterances	149	.26	21	.04

Analyses were completed as to the degree to which the mother's input matched, or was semantically-related to the child's ongoing activities or utterances. Several significant changes were noted in this area. First, there was a marked decrease in adult-initiated utterances related to the child's activity from pre-training (.54 of the mother's utterances) to post-training (.16 of the mother's utterances). In contrast, there was an increase in adult utterances which were related to child-initiated activities from pre-training (.17 of the mother's utterances) to post-training (.75 of the mother's utterances). In other words, the mother's style changed in that she followed and commented upon the child's self-initiated activities. Second, a marked decrease was noted in maternal utterances which were not related to the child's activities, vocalizations or utterances (from .26 to .04 of the mother's utterances).

Table 4 illustrates the semantic relations used by the mother during pre- and post-training.

Table 4

Type of Semantic Relations used by mother during pre and post training

Semantic Relation	Pre-training		Post-training	
	N	proportion	N	proportion
Action	191	.33	233	.41
Attribution	92	.16	2	.003
Notice	37	.06	18	.03
Negation	31	.05	34	.06
Existence	29	.05	89	.16
Vocative	27	.05	14	.02
Locative	20	.03	48	.08
State	10	.02	22	.04
Time	9	.02	7	.01
Specifier	8	.01	4	.01
Mood	7	.01	0	.00
Quantity	8	.01	3	.01
Recurrence	3	.01	11	.02
Possession	1	.001	6	.01
Affirmation	1	.001	17	.03
Coordinate	2	.001	0	.00
Social routine	48	.08	37	.07
Compound	51	.09	22	.04

Table 5

Child's Communicative Functions during pre and post training

Function	Pre-training		Post-training	
	N	proportion	N	proportion
Requests:				
Object:				
verbal	20	.09	37	.09
non-verbal	19	.09	12	.03
verbal + non-verbal	7	.03	8	.02
Action:				
verbal	1	.004	4	.009
Responses:				
verbal	1	.004	0	.00
non-verbal	148	.72	326	.80
Protests:				
non-verbal	1	.004	4	.009
Calls:				
verbal	4	.02	8	.02
Greetings:				
verbal	1	.004	1	.002
Labels:				
verbal	0	.00	2	.004
verbal + non-verbal	0	.00	1	.002
Uninterpretable	3	.01	3	.007

During pre-training sessions, approximately half of the mother's utterances encoded the semantic relations of action and attribution. Post-training analysis revealed an increase in the mother's use of utterances which encoded action and existence, with a marked decrease in the number of utterances which encoded attribution. Further it is important to note the decrease in utterances which encoded the semantic relations of notice and vocative.

In looking at the child's verbal output, G. produced 37 utterances during pre-training and 64 utterances during post-training sessions. In terms of non-verbal communicative acts, the child produced 168 non-verbal acts during pre-training and 342 non-verbal communicative acts during post-training.

In looking at this child's communicative functions, we can only make some general observational statements about his use of language. Pre- and post-training data were collapsed in the subsequent analyses. It should be noted that we did not expect to see marked changes in this child's output during the short time period between pre- and post-training sessions. Any changes in this child's linguistic output would occur over longer periods of time due to the severity of his communication problems. Table 5 illustrates that the majority of his verbal communicative acts were Requests for objects. The majority of his non-verbal communicative acts were responses.

An increase in the number and type of semantic relations expressed by G. was noted from pre- to post-training sessions. Further, during post-training there were occasional productions of two-word utterances. As can be seen from Table 6, during pretraining the majority of G.'s utterances encoded the semantic relations of existence (.73 of the child's utterances). During post-training, the majority of G.'s utterances encoded social routines (.45 of the child's utterances).

G.'s responses to the mother's use of imperatives and interrogatives is shown in Table 7. There was a decrease in the number of times G. did not respond from pre-training (.59 of the child's responses) to post-training (.31 of the child's responses). There was a marked increase in the number of correct responses to the mother's directions. It is important to note that G.'s verbal and non-verbal responses increased from .35 to .68 of the child's verbal and non-verbal communicative acts.

Table 8 illustrates the mother's adjacent responses following G.'s preceding utterance. Table 9 illustrates the mother's responses to the child's preceding non-verbal communicative acts. In terms of the mother's responses to G.'s immediately preceding utterance, there was a marked decrease in the number of responses that did not acknowledge the child's utterances from pre-training (.24 of the maternal responses) to post-training (.02 of the maternal responses). This was related to an increase in the number of maternal responses that acknowledged and maintained/expanded G.'s topic from pre-training (.08 of the maternal response) to post-training (.17 of the maternal responses). In other words, there was

Table 6

Type of Semantic Relations used by child during pre and post training

Semantic Relation	Pre-training		Post-training	
	N	proportion	N	proportion
Existence	27	.73	12	.19
Vocative	4	.11	9	.14
Action	2	.05	5	.08
Social routines	1	.03	29	.45
Locatives	0	.00	1	.02
Recurrence	0	.00	1	.02
Vocative + Existence	0	.00	3	.05
Vocative + Social routine	0	.00	1	.02
Uninterpretable	3	.08	3	.05

Table 7

Child's Response to Mother's Imperatives and Interrogatives*

Response	Pre-training		Post-training	
	N	proportion	N	proportion
Child responds correctly	112	.35	207	.68
Child does not respond	188	.59	94	.31
Child responds incorrectly	18	.06	2	.01
Total	318		303	

* includes verbal and non-verbal responses

an increase in the number of times the mother acknowledged G.'s utterances and tried to maintain or expand his self-initiated topics. Further, there were changes in the mother's ability to ignore the child's utterances which were not related to the immediate context. Table 9 illustrates the

Table 8

Mother's Responses to Child's Utterances*

Response (includes verbal and non-verbal)	Pre-training N	Pre-training proportion	Post-training N	Post-training proportion
Imitates child's utterance	5	.14	3	.05
Corrects child's utterance	1	.03	1	.02
Expands child's utterance	0	.00	2	.03
Acknowledges child's utterance:				
without adding new information	8	.22	8	.13
without maintaining topic	5	.14	1	.02
and maintains/expands topic	3	.08	11	.17
and ignores inappropriate topic	2	.05	3	.05
Does not acknowledge child's utterance	9	.24	1	.02
Does not acknowledge child's utterance which is not related to the immediate context	3	.08	32	.50
Uninterpretable	1	.03	2	.03
Total number of child utterances	37		64	

* includes verbal and non-verbal responses

mother's responses to G.'s non-verbal communicative acts. There was a decrease in responses in which the mother did not respond to G.'s non-verbal requests and protests, and an increase in maternal responses to non-verbal communicative acts.

Discussion

In looking at this parent-child interaction, we see similarities in styles with those that have been reported in the literature on normal as well as disordered adult-child exchanges. G.'s mother exhibited a directive and

Table 9

Mother's Responses to Child's Non-verbal Communicative Acts*

Response	Pre-training		Post-training	
	N	proportion	N	proportion
Responds to child's request	12	.60	12	.75
Responds to child's protest	1	.05	3	.19
Does not respond to child's request	7	.35	0	.00
Does not respond to child's protest	0	.00	0	.06
Total number of child's non-verbal communicative acts:	20		16	

* requests and protests only

constraining style in her communicative interactions with him. In terms of linguistic analyses, the majority of the maternal utterances were imperatives which usually functioned to get and/or direct the child's attention to an activity in the immediate ongoing context. Thus, we observed a relationship between form and function in that maternal sentence types were mainly used to control and direct this child's behaviors. This directive style is a prevalent style used by mothers addressing young normal language learning children.

In terms of language-impaired children, it has frequently been reported that mother's input to disordered children is primarily concerned with controlling the child's behavioral patterns and getting the child's attention. It seems that mothers of language-impaired children are more involved with directing the child's behaviors relating to activities of daily living and are thus, more constraining in their interactions (Stein, 1976; Giattino et al., 1978; Grossfeld and Geller, 1980). We have clearly seen this pattern in our observations of this mother-child pair. This type of maternal-child interaction may seriously result in less stimulating language learning contexts for the disordered child.

It is interesting to look at the mother's language use within the Teaching function. Here, the mother was primarily concerned about teaching G. how to manipulate toys as opposed to teaching or stimulating his language. Regardless of the context, the mother's style of interaction did not differ. We had expected to see different maternal styles of interaction dependent upon each of our varied contexts. However, our results indicated that the mother did not modify her style from context to context.

An important and consistent finding in the literature on mother's speech to normal language learning children is mother's constant interpretation of the young child's communicative intentions. It is interesting to note that G.'s mother rarely interpreted his intentions both before and after training. Of course, the reasons for the mother's lack of interpretations of the child's communicative intentions can not be known. G. may have been unclear in expressing his intentions (verbal and non-verbal) and gave non-linguistic cues which were difficult for the mother to interpret. Conversely, the mother's input may not have matched the child's communicative level, and thus the child was unable to respond to the mother's cues. As Mahoney (1975) states, "the potential non-verbal deficiency of autistic and mentally retarded children may not only impede language development by increasing the difficulty of the child's task of detecting the intention of the speaker, but may also interfere with the feedback system which provides language models with information necessary for regulating the complexity of their own language." (p. 144).

In terms of responsiveness, our initial impressions of the mother's style of interaction with G. over time were confirmed. G.'s mother infrequently interacted with G. in a playful or physical manner and

rarely gave any positive feedback to his non-verbal actions. In our training procedure, we attempted to improve her responsiveness to G.. However, minimal changes were observed in the mother's verbal responsiveness.

It is interesting to compare our results of this mother's responsiveness to those of Wulbert et al. (1975). Similar to their findings, mothers of language impaired children seldom praised their children and were generally more critical. Further, the mothers of disordered children seemed to engage in less playful positive interactions with their children. Thus, G.'s mother exhibited this same lack of responsiveness in her interactions with him.

Lieven (1978) makes the important point that the mother not only affects the child's style, but the child's style affects the mother's style. Further, perhaps the child's style evokes a certain style in all speakers (not just the mother). Lieven reports some striking individual differences between two mother-child pairs. She describes how the examiner interacting with one child adapted a style that was similar to that of the child's mother because the child's conversational pattern was so difficult to respond to. In summary she states that "a child by virtue of the way she/he talks, may be influencing the way in which other people speak to her/him." (p. 185).

In looking at semantically related speech, mother of normal language learning children generally produce utterances which are semantically related to the child's utterance. Cross (1978) described "good language teachers" as those mothers who attempted to maintain and expand upon their children's self-initiated utterances by adding information to the child's pre-established topic. In terms of parental speech to language impaired children, one study has reported that parent's speech is often not semantically related to the child's ongoing activities and/or preceding vocalizations. (Grossfeld and Geller, 1980). Further, Grossfeld and Geller found that the majority of parent's utterances to language impaired children were not related and infrequently followed the child's discourse topics. In other words, the parents constrained the topics of the child's speech.

Our findings contradicted those of Grossfeld and Geller. Both before and after training, most maternal utterances were semantically related to the child's or adult's ongoing activity. However, the mother's predominant style before training was to initiate and direct the child's activity and to talk about her own activities. After training, there was an increase in the mother's semantically related speech related to the child's self initiated actions. In other words, the mother was able to let G. direct the interaction and she was more flexible in her non-verbal and verbal interactions with him. In continuing to look at the semantic context of the mother's speech, we looked at her use of semantic relations. This mother usually spoke in the 'here and now' and her speech was semantically-related to the immediate context. However, many of the semantic relations used were not salient features within the context. For example, a large

proportion of the mother's utterances encoded attribution. After training, we saw a marked decrease in attribution and an increase in utterances coding existence. This change was more in tune with G.'s current linguistic level. It is interesting to note that during post-training the mother was better able to maintain the interaction with G. and there was a decrease in the semantic relations of vocative and notice. Thus, the mother did not need to use vocabulary words related to gaining attention. In looking at the semantic relations encoded by the mother after training, we saw a closer correspondence between the semantic relations used by the mother and those encoded by G.

In terms of this language impaired child, G. was a minimally verbal child. He encoded a few early occurring semantic relations and communicative functions. After training, there was an increase in the total number of the child's communicative acts and changes in his communicative style. In looking at the bidirectional effects of the mother-child interaction, a few changes in their patterns of communication were noted. First, there was an increase in the number of times the child responded to the mother's imperatives and interrogatives. One could speculate that the changes in the mother's linguistic style and her decrease in M.L.U. may have affected G.'s ability to respond. Second, since the mother was better able to follow the child's 'lead' and was more responsive to his verbal and non-verbal actions, it may have given G. more opportunity to initiate interactions. As Bowerman (1978) states "the child possesses highly effective methods for learning what operates best if he is allowed to control the verbal interactions as much as possible". (p. 174) Thus, it would be important to see if over time the language learning environment of this child continue to affect his ability to initiate and control interactions with his mother. Further, we would want to see what effects this would have on communicative output.

In summary, continued research is needed in looking at the language learning environment of the disordered child. Although our findings are preliminary and based on only one mother-child pair, we can see communicative styles that may impede language/communication development. Clinicians must move out of the therapeutic context; observe mother-child interactions and start to derive communication training programs that include parents of language-impaired children. Training should focus on modifying the parent's communication styles with their child when they are not conducive to language learning.

Appendix A

DATA SHEET USED IN TRAINING

CHILD_____ CONTEXT_____ DATE_____

CONTENT OF INPUT:

* ADULT TALKS ABOUT WHAT CHILD IS DOING

* ADULT GIVES CHILD OPPORTUNITY TO INITIATE/RESPOND

ADULT WAITS FOR A RESPONSE (e.g: ADULT WITHHOLDS TOY OR FOOD)

* ADULT JOINS CHILD IN PLAY

ADULT DIRECTS CHILD'S PLAY

ADULT TRIES TO GET CHILD'S ATTENTION

TEACHING STRATEGIES:

ADULT USES IMITATION

ADULT IMITATES SELF

ADULT IMITATES CHILD

ADULT MAKES CHILD IMITATE

* EXPANSIONS

* INTERPRETATIONS

ADULT TEACHES CHILD NAMES

* ADULT USES GESTURES TO CLARIFY MESSAGE

RESPONSIVENESS:

* ADULT IS RESPONSIVE TO CHILD

PHYSICAL INTERACTIONS

VERBAL PRAISE

CORRECTIONS

* areas highlighted during training

Appendix B

Mother's Communicative Functions

I. Requests

- A. to give directions related to discipline or activities of daily living
- B. to elicit information from the child
- C. to suggest an activity
- D. indirect request (to bribe the child to complete the task)

II. Interactional

- A. to engage or maintain play
- B. to get or direct the child's attention
- C. conversational fillers
- D. clarifications (to check the child's message)

III. Teaching

- A. use of imitations (imitation of child; imitation of self)
- B. use of expansions
- C. explicit corrections of the child's utterance or activity
- D. use of interpretations
- E. to play the "name game" (to ask "What's this?" or adult labels objects or attributes)
- F. to teach the child how to manipulate toy/object
- G. to comment on the child's or the adult's activity

IV. Responsiveness

- A. adult acknowledges child's non-verbal behavior
- B. adult acknowledges child's verbal behavior
- C. adult acknowledges child's verbal behavior and tries to maintain the topic
- D. adult acknowledges child's verbal but ignores the topic
- E. adult does not respond to child's verbal behavior
- F. adult does not respond to child's inappropriate behavior

V. Uninterpretable

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A pragmatic touch to teaching an emotionally disturbed child prosody

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Abstract

The present study investigated the effects of a prosody training program on an emotionally disturbed child's ability to learn the suprasegmental features of pitch and duration and on his ability to use these elements for the expression of communicative intentions. The training procedure was adapted from prosody training programs developed for the hearing-impaired population. Additionally, the experimenters incorporated a pragmatic approach which entailed teaching the child to produce a variety of prosodic patterns within utterances serving the communicative functions of request and protest. The child's performance was analyzed within three contexts: trained, non-trained and spontaneous. Results indicated that the child was able to produce pitch and duration accurately and to use them appropriately within utterances of varying intention.

Prosody refers to the melody of our speech which occurs as a result of varying the suprasegmental elements of pitch, loudness and duration (Crystal, 1969). In addition to its acoustic aspects, prosody has also been found to play an important "linguistic" function in terms of conveying meaning, feelings and emotion (Dore, 1975; Wood, 1976; Bloom and Lahey, 1978; Berry, 1980).

During the early months of life, the normal infant begins to perceive and produce the prosodic elements of his language. Initially, the infant communicates through crying which is "meaningful only in the sense that [it has] physiological reference" (Berry, 1969, p.128). According to Menyuk (1971, 1972), an infant's early cries can be associated with either hunger or pain, and the patterns produced may be termed as declarative and emphatic cries. In studying the vocalization of infants in their first five months of life, Sheppard and Lane (1968) noticed a drop in pitch in the first month. In the second month, pitch increased until reaching the fourth month when no change in pitch was observed. The authors suggested that in addition to a physiological change occurring within the vocal cords and respiration system of the infant, the pitch changes may have been related to the function of his vocalizations. They felt it is possible that the infants first cries were reflexive in that they reflected his daily needs. Later on the infant becomes increasingly "motivated", demonstrating greater control over his vocalizations to signal his needs. Kaplan and Kaplan (1971) stated that by four or five months of age the infant produces a variety of non-cry vocalizations which are distinct from one another.

Eventually, the infant enters the babbling stage in which he begins to produce intonated vocalizations. During the second half of the first year,

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the infant "learns to ask questions, express anger, and communicate excitement - not with words but with the gobbledy-gook" (Wood, 1976, p.208). In sum, it appears that during the pre-linguistic stage of normal language development, the infant initially acquires the non-segmental or supra-segmental aspects of his speech which compose the "form" of his language system. Gradually, he acquires the words to express the semantic component of his language which are then woven into these earlier learned prosodic patterns (Berry, 1969; Wood, 1976).

More recent discussions of the role of intonation in communication development can be found in the pragmatic literature. According to Dore (1975), the young child's emerging language or his single word utterances can be described as "primitive speech acts" which consist of a "rudimentary referring expression" or the single word and a "primitive force" such as the accompanying intonation pattern. Dore (1975) provides the example of "mama" which was expressed by one-year old children with three varying intonations. Each intonation conveyed a different meaning or function. For example, the word "mama" was produced with a falling terminal intonation in order to label, with a rising terminal intonation to request and with a sudden rising-falling intonational contour in order to call. Thus, although the same word was produced, Dore was able to identify several communicative intentions expressed by children at the single-word stage including labeling, requesting, and calling. Menyuk and Bernholtz (1969) studied the single word utterances of a young child developing language. It was observed that the child spontaneously produced varying intonational patterns with the same as well as with different lexical items. Their results, which would support those found by Dore (1975), indicated that labeling objects in the environment was not the only communicative intention expressed by the child. Other intentions included requesting, getting another person's attention, etc. Bloom and Lahey (1978) additionally noted that at times, young children employ nonverbal means such as intonation, facial gestures and body movements to express differences in communicative intention in lieu of altering the syntactic form or lexical item. By the age of three, the normal child exhibits adequate mastery over the use of the prosodic features of pitch, loudness and duration in order to convey meaning and structure. This particular ability continues to improve with age (Miller and Ervin, 1964; Wood, 1976).

In examining normal children's linguistic systems, one will observe an interaction between the three major components of language; content, form and use. Each utterance produced can be described in terms of which semantic relations are expressed, what specific syntactic form is chosen and what function the utterance serves. However, language impaired children demonstrate a disruption in the interaction of these components in their language system. Specifically, emotionally disturbed, psychotic or schizophrenic children may exhibit a disturbance in the interaction between the content and the form of their utterances as observed in their frequent reversal of pronouns. For example, they may produce the pronoun "you" when referring to themselves. Other children may demonstrate a disruption with the interaction of content and use. A child may produce the utterance, "It's raining", when in fact it is sunny. In addition, a disturbance between the form and use of their utterances may occur which can be illustrated when the child produces a falling terminal intonation for an utterance that expresses the communicative function of a request for information (Bloom and Lahey, 1978). Furthermore, several studies investigating the language abilities of emotionally disturbed children have found their pragmatic deficits to include limitations in their

expression of communicative intentions (Baldo, Wollner, and Geller, 1978; Schecterman, Wollner and Geller, 1978).

With regard to the population of psychotic children, pervasive speech deficits have frequently been noted. Specifically, in terms of prosody, Baltaxe and Simmons (1975) observed a relationship between the prosodic elements of rhythm, pitch, volume and intonation and the content of language. They found that those psychotic children who demonstrated a language impairment also had prosodic deficits, while those children who did not exhibit an impairment in their linguistic systems had no prosodic problems.

The speech of the psychotic population has been consistently characterized by the following abnormalities: monotonous in pitch, intensity and rhythm, mechanical, bird-like quality, flat affect, dull, wooden, bizarre and idiosyncratic (Goldfarb, Braunstein and Lorge, 1956; Ostwald, 1965; Pronovost, Wakestein and Wakestein, 1966; Bettelheim, 1967; de Hirsch, 1967; Goldfarb, Goldfarb, Braunstein and Scholl, 1972; Yudkovitz, Lewison and Rottersman, 1975). Most of these descriptions suggest that the psychotic population fails to speak with adequate emotion and their vocal characteristics do not relate to the content of their utterances or the immediate context (Goldfarb et.al., 1956, 1972). Wing (1972) notes that although an autistic child is capable of imitating an adult's utterance including replicating the exact stress and intonation that were originally used, in spontaneous speech their use of prosodic elements is extremely poor.

Several researchers have hypothesized that autistic or psychotic children demonstrate difficulty with language comprehension and production as a result of having deficient regulatory mechanisms for speech. These deficits prevent prosody from facilitating the processing of incoming and outgoing linguistic stimuli (Baltaxe and Simmons, 1975; Goldfarb et.al. 1972). Possible evidence to support this notion may be found by noting the pervasive use of echolalia by these children. It may be that due to an impaired regulatory mechanism for speech along with lack of aid from prosody, these children are unable to perceive the constituent parts or individual units of the utterance heard, and as a result "encode the entire utterance chunk-style" (Baltaxe and Simmons, 1975, p. 349).

Additional support for the impairment of this intonation contouring system within autistic children is provided by Ricks' (1975) study. The vocal signals expressing a request, a greeting, frustration and surprise were compared in autistic and normal children. Parents of autistic children listened to and identified the meanings conveyed by the cries of normal children and of their own autistic child but demonstrated confusion with the meanings expressed by the cries of other autistic children. This study suggests that autistic children have their own idiosyncratic cries, (i.e., they do not share a vocabulary of intonated signals with other autistic or normal children). Ricks (Ricks and Wing, 1975) had also observed the babbling of these autistic children and characterized it as monotonous.

It is important to note that the deficits found in the pragmatic abilities of emotionally disturbed children are not restricted to their verbal means of communication. The prosodic elements in the speech of most

psychotic children and adults neither express emotion adequately nor convey meaning appropriately. Limitations are present in their use of voice for the expression of communicative intention as well (Fay and Schuler, 1980).

It may be of further interest to consider the striking similarities observed between the speech characteristics of autistic children and those of the deaf population. The following suprasegmental errors have been noted in the speech of the hearing-impaired: monotonous in pitch, staccato patterns whereby there is equal stress and pause on each syllable, excessive pitch changes, high pitch, slow rate and poor rhythm (Angelocci, Kopp and Holbrook, 1964; Martony, 1968; Nickerson, 1975; McGarr and Osberger, 1978).

Several speech training programs have been developed for the hearing impaired directed to training the suprasegmental aspects of speech. Ling's approach (1976) "provides the child with the necessary repertoire of speech patterns which can be differentiated, if not through hearing, through unambiguous orosensory images and motor codes. (p.4)". Training is facilitated through the use of the auditory, tactile and visual modalities. Osberger, Johnstone, Swarts and Levitt (1978) developed a speech training program which is an adaptation of Ling's approach. Their auditory-oral approach is used to train a variety of suprasegmental patterns within a hierarchy, employing imitation, discrimination and spontaneous tasks.

Despite the pervasive nature of the prosodic problems seen in psychotic children, no attempt has been made to systematically train this aspect of communicative development. Also, as noted previously, numerous limitations have been found in their use of voice and language to communicate their intentions. In view of these findings, we attempted to adapt the prosodic training programs developed for the deaf to the needs of an autistic child. In the present study we explored the effects of training prosody and its communicative use simultaneously. The purposes of this study were then to investigate whether prosody, specifically the suprasegmental elements of pitch and duration, could be trained, and whether the child's expression of communicative intentions could be enhanced through prosodic training.

Method

Subject:

The subject, D., was a 7.11 year old language impaired male who had been attending the Queens College Speech and Hearing Center for intensive language therapy since September, 1976. Upon initiation of therapy, D. exhibited a severe receptive and expressive language impairment characterized by stereotypic one and two word utterances, jargon and limited gestures. With the exception of language and communication, developmental milestones were attained within normal limits. A neurological evaluation (1/78) revealed evidence of a static encephalopathy of probable prenatal nature. Hearing was found to be within normal limits.

Past language and communication therapy focused on developing reciprocal interactions, increasing D.'s representational abilities through symbolic play and encoding and coordinating a variety of semantic relations within different communicative functions. At the time of the present study,

the mean length of D.'s utterances was approximately 3.8. Although D. was able to express a variety of semantic relations, coordination of these content categories within his utterances was limited. In terms of D.'s pragmatic abilities, D. frequently commented, labeled, requested and regulated others' actions. However, D.'s communication skills still remained severely impaired with respect to his conversational skills involving the initiation, maintenance and termination of a verbal exchange with another individual. Therapy frequently required stimulating both auditory and visual modalities. D. produced trained utterances in trained and non-trained contexts and was able to generate novel utterances.

In the past and at the time of the study, D. demonstrated behaviors which are characteristic of the autistic population such as impaired interactional skills, ritualistic play, echolalia and mechanical speech. In reference to the latter, D. consistently exhibited an unusual prosodic pattern including a lack of intonational contour, a rapid rate, and at times a harsh-whispery quality.

Apparatus:

The experimental procedure was conducted in a 10' by 15' room at the Queens College Speech and Hearing Center. The subject and the experimenter were seated next to each other at the table during Stages I through III and facing each other on the floor during Stage IV. All training stimuli were presented on 4" by 6" white cards in Stages I and II, and on 5" by 8" cards for Stages III and IV. Stimulus materials for Stage IV also included a pool of toys and food items which is described in Appendix C. Primary reinforcement consisted of chocolate candies. Data for each training session were recorded by at least two speech and language graduate students for reliability purposes. In addition, the pre- and post-training baselines were videotaped using a Sony 3400 deck.

Procedure:

Pre-training: Prior to training, the subject's production skills were judged by ten speech-language-pathology and audiology students who were enrolled in the graduate program at Queens College. These observers were unaware of the purpose of the experiment. The observers were asked to view a videotape of the subject interacting with the experimenter in a variety of contexts. They had to rate the subject's production skills in terms of articulation, fluency, voice quality, rate, pitch and loudness and then describe the behaviors observed (see Appendix A for the questionnaire used). In addition, the experimenter analyzed the subject's performance with respect to his use of the prosodic elements of pitch, duration and loudness.

The subject's production skills were rated in contexts that would be used during training in Stage IV. These contexts were similar to the training contexts but differed in the stimulus materials involved. There was a total of 17 contexts rated by the observers (see Appendix C for a detailed description of the contexts viewed).

Training: The use of two suprasegmental features was trained: pitch and duration. Pitch is dependent upon the fundamental frequency of vocal

cord vibration and is perceived as a tone ranging from low to high. Duration is the perceived rate/length of our speech, ranging from fast/short to slow/long (Crystal, 1969; Berry, 1980). Training of each of the prosodic features occurred in a total of four stages, I-IV. Stages I through III were hierarchically arranged according to the number of units involved per stimulus. Stimuli presented during Stage I were composed of single units involving an individual phoneme or word (e.g.,/eI/, "take"), while those presented during Stage III contained three units each involving three phonemes or words (e.g., /eI/i/ou/, "take, keep, poke"). Within each of these stages, there were two levels, A and B; level A stimuli consisted of phonemes while level B stimuli consisted of words. For example, Stage III stimuli had three units consisting of three different phonemes such as /i/,/ou/ / eI/ or three different words such as "keep, poke, take" in levels A and B, respectively.

In Stage IV, three-word meaningful utterances serving the communicative functions of request or protest were presented. Requests were defined as those utterances produced by the child in order to request an object from the adult (e.g., "I want that"). Protests referred to those utterances produced by the child in response to an undesirable action imposed upon him by the adult (e.g., "Don't do that"). There was a total of four target utterances, and each utterance was trained in two different contexts (see Appendix C).

Within each stage, a variety of prosodic patterns for the features of pitch and duration was presented. For each prosodic feature, two patterns were trained during Stage I and four patterns were trained during Stages II through IV. Patterns remained the same within Stages I-III but differed across the stages. The patterns presented during Stage IV were selected from those previously trained in Stage III. In Stages I-III pitch and duration were trained separately. Co-occurrence of pitch and duration was established in Stage IV. In other words, both features were presented together within the same training stimulus.

Training of the prosodic features involved presenting the subject with both auditory and visual stimuli (i.e., the experimenter modeled the prosodic pattern and, simultaneously, presented a graphic cue of it. Pitch was represented graphically by placing the written sequence on the phoneme or word either on the upper part of the card for a high pitch, e.g., (ee), or on the lower end of the card for a low pitch, e.g., (take). Short and long durations were represented through the use of color differentiation in addition to varying the length of a line placed under the unit. If the duration pattern was short, then the unit/s of the stimulus was/were written in blue, and a short line was placed under it. Similarly, a long duration was signaled through the color red and an accompanying long line. Detailed information on the specific units and patterns presented can be found in Appendix B.

The prosodic features of pitch and duration were trained over 29 sessions. During Stages I-III, each session consisted of two training periods, one at the beginning and one at the end of the session. Only one prosodic feature was trained per training period. The training of pitch and duration was counterbalanced in terms of which feature was trained first during each training session. For Stage IV, two of the four target utter-

ances, one of which served the request function and one which served the protest function, were trained per session in two different contexts each (see Appendix C). Again, the training of the utterances was counterbalanced with regard to which utterance was trained at the beginning of each session.

The following three tasks were included in training: (1) an imitation task -- the experimenter introduced the graphic cue and produced the prosodic pattern as it was represented on the card, e.g., "D., this is [ee]. You say it", whereby the subject was then required to imitate that pattern; (2) a discrimination task -- the experimenter presented two graphic cues which illustrated different prosodic patterns for the suprasegmental feature trained. The experimenter then produced one of the patterns, for example, "Show me [ee] ", and the subject was required to identify that pattern by selecting the correct card; (3) a spontaneous task -- the graphic cue of a prosodic pattern was presented to the subject. He was then asked to produce the pattern in response to the experimenter's question, "What's this?".

The discrimination task was presented in level A of Stages I-III whereas the imitation and spontaneous tasks were presented within levels A and B of all four training stages. It should be noted that within a level, the imitation task always preceded the spontaneous task. For imitation and spontaneous production, an 80% correct response criterion level over two consecutive sessions had to be attained before proceeding on to the next level of training in Stages I-III. For instance, the subject was required to perform with at least 80% accuracy for two days on spontaneous production in Stage I level A before proceeding to the imitation task in Stage I level B. Performance on the discrimination task was independent of the other tasks, (i.e., the subject's performance on the discrimination task did not affect the presentation of the imitation and spontaneous tasks).

When the subject reached the criterion level in Stage IV with respect to the spontaneous production of a target utterance, a different utterance serving the same communicative function was introduced for training. In addition, the graphic cues were eliminated in Stage IV after the subject performed with 80% accuracy spontaneously in one training session. Failure to achieve this criterion level throughout all the stages resulted in the presentation of the task until the criterion was met.

Immediate primary and social reinforcement accompanied each correct response in Stage I. During the remaining stages, intermittent reinforcement was given for every four correct responses. When the subject produced an incorrect response, the experimenter said, "No. This is _____.", modeling the correct response. The same training stimulus was then reintroduced. A maximum of two extra training trials was presented to the subject.

The number of trials presented for the imitation and spontaneous tasks during Stages I through III ranged from 12 to 16. The discrimination task involved the presentation of 6 trials per prosodic feature in each stage. In Stage IV, there were 10 trials for every prosodic pattern or utterance trained.

Post-training: Following training, the subject's prosodic skills were observed and analysed by the experimenter in the 17 contexts as done previously in the pre-training stage. A minimum of five target or other appropriate utterances in response to each context was hand-recorded by a speech and language graduate student as well as audiotaped for reliability purposes.

Results

Pre-training: The observers were asked to rate D.'s spontaneous language output in response to the 17 contexts described earlier. Although D. did not produce the target utterances, he was able to use appropriate language within the contexts in order to request and protest an action.

For each production skill, the mean rating among all ten observers within all of the contexts was determined. The observers perceived an inappropriateness in D.'s production skills of voice, rate and interestingly, articulation as evidenced by their mean ratings of "4" which are based upon the seven-point scale found on the questionnaire. D.'s fluency and pitch both received an average rating of "3". Loudness was rated as the best production skill with a mean rating of "2" (see Table 1).

Table 1

Mean ratings of the production skills observed*

Production Skill	Mean Rating
Articulation	4
Voice Quality	4
Rate	4
Fluency	3
Pitch	3
Loudness	2

* Ratings based on seven-point scale in which lower numbers represent adequate skills while numbers of "4" or higher represent inadequate skills.

In further describing the subject's production skills, the following behaviors were noted. D.'s voice quality, when labeled inappropriate, was most frequently judged as harsh (47.3%) and hoarse (16.5%). His rate of speech was described as rapid 91.6% of the time. The pitch of D.'s voice, when perceived as inappropriate, was often described as high (35.7%), low (21.4%) and fluctuating inappropriately (33.3%). Inappropriate fluctuation of D.'s loudness was also present 65.5% of the time. D.'s articula-

tion, when perceived to be inadequate, was described as consisting primarily of substitutions 34.6% of the time (see Table 2).

A descriptive analysis done by the experimenter of the same utterances rated by the observers also revealed a variety of prosodic problems. D's voice appeared to have a harsh-hoarse quality occasionally. In addition, D. was inconsistent in his production of utterances with appropriate intonation patterns. Although a few of D.'s utterances were produced with the appropriate accompanying prosody, D. chose to speak with a high monopitch tone in other instances, and sporadically ended a declarative sentence with a rising intonational contour. However, the most frequent error observed during his production involved his rate of speech. D. usually produced his utterances with a rapid monorate which at times interfered with his intelligibility. His articulation, fluency and volume were all exceptionally good.

Training: During Stages I through III, D. performed with accuracy and a minimum amount of effort in the imitation, discrimination and spontaneous tasks presented to him. D. was able to attain the 80% correct response criterion level, the majority of the time, within two consecutive sessions for every level in each of these stages.

Upon entering Stage IV, D. experienced a slight difficulty in learning the prosodic pattern of the target utterance "I need some" (D. produced this utterance with 70% accuracy on the second day of the imitation task). Rather than produce the first lexical item with a longer duration than the others, D. preferred to produce each word with equal duration. D. did, however, learn this target pattern and the others presented during Stage IV of training.

Post-training: For each of the training contexts used during Stage IV (eight in all), D. was able to produce the trained utterances with their accompanying trained prosodic patterns correctly 100% of the time. However, D. did demonstrate an inappropriate reduction of his volume in three of the eight contexts or 38% of the time.

In terms of generalization of the prosodic patterns trained, there were several significant findings. D. was able to produce the trained utterances serving the request communicative function with 100% accuracy in three of the four non-trained versions of the training contexts. During the remaining context, D. produced appropriate language which was characterized by his pre-experimental pattern of speech, particularly that of a rapid monorate.

With regard to D.'s output within the protest function during the non-trained contexts, D. was able to produce the trained utterance, "It's my turn", correctly 100% of the time. Although D. did not produce the trained utterance "Don't do that" in order to protest an action during the non-trained contexts, he did appropriately use the utterance "I want that" which had been trained within the request function. Again, D. demonstrated a volume reduction in three of the eight non-trained contexts or 38% of the time (see Table 3).

Table 2

Frequency of behaviors found unacceptable in the child by ten observers

Production Skill	Behavior	Number of times noted	Percentage	Behavior	Number of times noted	Percentage
Articulation	substitutions (S)	28	34.6	0 + D	3	3.7
	omissions (O)	8	9.9	0 + A	1	1.2
	distortions (D)	15	18.5	D + A	2	2.5
	additions (A)	1	1.2	S + D + A	1	1.2
	S + 0	8	9.9	S + 0 + A	1	1.2
	S + D	7	8.6	S + 0 + D	3	3.7
	S + A	2	2.5	S + 0 + D + A	1	1.2
Voice	harsh (H_1)	43	47.3	$H_1 + H_2$	5	5.5
	hoarse (H_2)	15	16.5	H_2 + B	3	3.3
	breathy (B)	9	9.9	H_1 + B	11	12.1
	nasal (N)	2	2.2	$H_1 + H_2$ = B	3	3.3
Rate	rapid (R)	87	91.6			
	slow (S)	1	1.1			
	monorate (M)	6	6.3			
	R + M	1	1.1			
Fluency	repetitions (R)	10	40.0	R + H	1	4.0
	prolongations (P)	2	8.0	P + H	1	4.0
	hesitations (H)	10	40.0	R + P	1	4.0
Pitch	too high (H)	15	35.7	monopitch (M)	3	7.1
	too low (L)	9	21.4	I + H	1	2.4
	inappropriate fluctuation (I)	14	33.3			
Loudness	too loud (L)	5	17.2	monoloud (M)	2	6.9
	too soft (S)	2	6.9	I + L	1	3.4
	inappropriate fluctuation (I)	19	65.5			

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Table 3

Summary of child's production of target utterances in trained and non-trained contexts.

Utterance	Communicative Function	Trained	%Correct	Non-trained	%Correct
I need some	Request	1. potato chips	100↓	1. soda	0 *-
		2. fiddle-sticks	100↓*	2. puzzle	100
I want that	Request	1. train set	100	1. lumberyard	100
		2. Wobble Race	100↓	2. Pile On	100↓
Don't do that	Protest	1. watergun	100	1. vaseline	0 *
		2. Mr. Pop	100	2. Superman colorforms	0↓*
It's my turn	Protest	1. Fuzzy Pumper	100	1. Ladybug game	100
		2. Twister	100	2. Fishing game	100

↓ = reduction in volume
* = appropriate language used in addition to/in lieu of trained utterances with acceptable prosodic patterns
*- = appropriate language used in addition toin lieu of trained utterances with unacceptable prosodic patterns

In addition to using the trained utterances, it was interesting to note that sporadically during trained and non-trained contexts, D. produced some of the trained prosodic patterns using different lexical items. For example, he produced "You blow it", "Where's that piece?", and "Look at this" in which the underlined words represent those that D. produced with a longer duration and higher pitch than the other constituents. D. also used a variety of appropriate prosodic patterns which were not trained. For example, D. produced utterances such as "I don't want that" and "I need some arms".

Similar observations were made when analyzing D.'s spontaneous language within a natural play interaction. D. produced utterances such as "I need aspirin /a hammer", "I get a needle", "and you sit there", "we wanna be in the movies", and "and you get popcorn". All of these utterances demonstrate the possible positive generalization effects of exposing D. to a prosody training program. For the remainder of the language sample, D.'s speech could be described as having the identical characteristics which it had prior to training. Occasionally, D.'s voice had a harsh-hoarse quality and his pitch was extremely high at times. Frequently, D. spoke with a rapid rate and with equal duration placed on each word. His volume, fluency and articulation were acceptable.

Discussion

Based on the pre-training data collected for the present study, the subject was found to exhibit a prosody impairment, particularly in the areas of voice quality and duration. It is interesting to note that some differences did exist between the observers' and the experimenter's assessment of the subject's articulation and pitch skills. D.'s articulation was regarded as unacceptable and his pitch was rated as appropriate by the majority of the observers whereas the experimenter found the reverse. Such a discrepancy may have occurred as a result of the difficulty experienced by the observers in understanding D. since his speech was sporadically unintelligible although not necessarily due to his articulation. The observers also had to contend with the difficult task of perceiving and rating pitch simultaneously with the other production skills found on the questionnaire. For each production skill, D. was additionally observed to produce a wide range of speech problems when an utterance was perceived as inappropriate. For example, in describing D.'s voice quality, the observers noted harshness, hoarseness, breathiness, nasality and several combinations of these in different contexts (see Table 2). These results illustrate the range of deficits often found in psychotic children and perhaps, more accurately, the difficulty clinicians have in describing these prosodic problems.

Results of the training study indicated that the subject clearly demonstrated the ability to learn the suprasegmental elements of pitch and duration. D. responded to the imitation, discrimination and spontaneous tasks presented to him during Stages I through III with facility as evidenced by his rapid attainment of the criteria.

In terms of learning to use these patterns to express different communicative intentions, D. was able to use the trained utterances serving the communicative functions of request and protest and their accompanying

prosodic patterns appropriately and accurately within the trained contexts. Interestingly, D. also demonstrated generalization of the use of most target utterances in non-trained versions of the trained contexts, especially of the utterance "I want that". This particular utterance appeared to be the most salient for D. in that he frequently produced it in lieu of or in addition to the other trained utterances. The only target utterance D. did not produce within the non-trained contexts was "Don't do that" which served the protest function.

Two other types of generalization were noted. At times, during the trained, non-trained and spontaneous contexts, D. produced the target prosodic patterns with varying lexical items and more importantly, he produced appropriate patterns which had not been trained at all. Of course, it is difficult to establish whether these instances were the direct consequence of the prosody training program. It should be mentioned that the extent of D.'s learning of the suprasegmental elements and patterns appeared to be somewhat limited in that once novel stimuli were introduced which were not similar to those used during training, generalization was minimal. In fact, D.'s spontaneous speech (i.e. when he produced utterances other than those that were trained) continued to be characterized as rapid, monorate and high pitched.

A possible explanation suggested by Ricks and Wing (1975) for the excellent performance demonstrated by our subject in learning the suprasegmental features and their use may be the result of his memory. These authors feel that the autistic child's experiences and activities, which involve the "use of symbols" and are stored in memory, can be recalled "unchanged in response to the appropriate stimulus" since "they follow strict, inflexible rules which, once learned, can be applied without the need for variation". (p.216). However, if the idea posed by Ricks and Wing is expanded upon, with reference to the presentation of novel stimuli to the child, then it would be reasonable to assume that as a consequence his performance could be affected in a negative manner. Perhaps this latter point can explain the limitations demonstrated by our subject in his generalizing the use of the learned prosodic patterns in the non-trained and spontaneous contexts.

In the past, prosody disturbances have been viewed in isolation and frequently, as the result of faulty speech mechanisms. The child's mechanism for language acquisition which deals with auditory perception and monitoring has often been suggested to be impaired and to interfere consequently with the child's learning process (Goldfarb et.al.,1972; Simmons and Baltaxe, 1975; Ricks and Wing, 1975; Fay et.al.,1980). However, according to Fay and Schuler (1980), the autistic population's speech "peculiarities are more readily understood as a pragmatic failure than as defective speech production...[since] they may reflect a limited ability to monitor one's behavior on the basis of social cues and therefore reflect communication problems in a broader sense". (p.111) The authors of the present research study are in agreement with this contemporary view. We feel that the prosody impairments often noted in emotionally disturbed children are linked closely with their pragmatic deficits and that language intervention should not treat these areas as discrete and unrelated.

Communicative intent may be expressed through verbal and nonverbal means, and it is determined by examining the content of the speaker's

message as well as how he conveys the message (Fay and Shuler, 1980). Recent investigations have found that autistic children express a limited number of communicative functions linguistically (Baldo, Wollner and Geller, 1978; Schecterman, Wollner and Geller, 1978). On the nonverbal level, a comparable pragmatic disorder has also been found in the autistic child's use of gestures, facial expressions, body movements and voice (Ricks and Wing, 1975; Fay and Schuler, 1980).

Training prosody and the use of various communicative intentions to emotionally disturbed children is clearly new to the field of speech and language pathology. In the present study, we have attempted to modify the suprasegmental training programs used for the hearing impaired and incorporate these changes into a pragmatic training program for an emotionally disturbed child.

In summary, it is our feeling that the pervasive prosodic deficits found in psychotic children are integrally tied to their linguistic and pragmatic deficits. Taking this one step further, it is clear that training programs must reflect the synergy that exists in normal development among various aspects of communication (e.g. form, content and use) especially for the populations of language impaired children with whom disruptions in all areas are typical.

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Appendix A

Please rate the subject's production skills by circling the appropriate number on the scale in Column I. The lower end of the scale (e.g. 1,2) represents adequate skills while the upper end of the scale (e.g. 6,7) represents extremely poor or unacceptable skills. If you have circled the number 4 or higher, please specify in Column II the behavior/s which best describe/s the subject's production.

Production Skill	I	II
Articulation	1 2 3 4 5 6 7	___substitutions ___omissions ___distortions ___additions
Voice Quality	1 2 3 4 5 6 7	___harsh ___hoarse ___breathy ___nasal
Rate	1 2 3 4 5 6 7	___too rapid ___too slow ___monorate
Fluency	1 2 3 4 5 6 7	___repetitions ___prolongations ___hesitations
Pitch	1 2 3 4 5 6 7	___too high ___too low ___inappropriate fluctuation ___monopitch
Loudness	1 2 3 4 5 6 7	___too soft ___too loud ___inappropriate fluctuation ___monoloudness

Appendix B

Stage	Level	Form of Stimulus	Stimulus	Prosodic Pattern	
				Pitch	Duration
I	A	single phoneme	a, ee, o	high, low	long, short
	B	single word	take, keep, poke	Same as IA	
II	A	two phonemes	a + ee ee + o o + a	high + low high + high low + high low + low	long + short long + long short + long short + short
	B	two words	take + keep keep + poke poke + take	Same as IIA	
III	A	three phonemes	a + ee + o ee + o + a o + a + ee	low + high + low low + low + high high + low + low high + high + low	short + long + short short + short + long long + short + short long + long + short
	B	three words	take + keep + poke keep + poke + take poke + take + keep	Same as IIIA	
IV		three-word utterance	I need some	{long + short + short high + low + low}	
			Don't do that	{long + long + short high + high + low}	
			I want that	{short + short + long low + low + high}	
			It's my turn	{short + long + short low + high + low}	

Appendix C

Request Function

Utterance		Context	Stimulus Materials Trained	Non-trained
I need some	1.	E. distributes food to several people including the subject. Then E. re-distributes food to all except the subject.	potato chips	soda
	2.	E. distributes only a few parts of a toy to the subject. E. keeps the rest.	fiddlesticks	puzzle
I want that	1.	E. presents the subject with a choice of toys. E. asks the subject, "which one?"	train set book puzzle box stuffed animal	lumberyard book puzzle box stuffed animal
	2.	E. places a variety of toys out of reach. E. has the subject point to the desired toy by prompting him with "Pick a toy". E. gives the subject the wrong toy.	Wobble Race schoolhouse ball duck	Pile On game schoolhouse ball duck

Protest Function

Don't do that	1.	E. continues to annoy the subject without stopping.	watergun	vaseline
	2.	E. allows the subject to play with a toy for several minutes. E. proceeds to grab toy away from the subject.	Mr. Pop	Superman colorforms
It's my turn	1.	E. plays with toy initially without permitting the subject to play.	Fuzzy Pumper	Ladybug Fly Away
	2.	E. brings out group game. E. assigns turns to the participants. E. skips over the subject's turn.	Twister	Fishing game

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